

JANUARY 1995  
Volume 63 No 1

# **RADIO** **AMATEUR**



*Journal of the Wireless Institute of Australia*



Full of the latest amateur radio news, information and technical articles including

- \* **Back to Basics 40 or 80 m Receiver**
- \* **Capacitors at High RF Power**
- \* **QRP — The Art of Low Power Operation**

**Plus** lots of other articles and special interest columns

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## CONTENTS

### Technical

|  |    |
|--|----|
| Back to Basics 40 or 80 m Receiver     | 4  |
| Neville Chivers VK2YO                  |    |
| Capacitors At High RF Power            | 7  |
| Lloyd Butler VK5BR                     |    |
| QRP — The Art of Low Power Operation   | 10 |
| David "Doc" Wescombe-Dow VK4CMY/VK5HP  |    |
| Random Radiators                       | 12 |
| Ron Cook VK3AFW and Ron Fisher VK3OM   |    |
| Technical Abstracts                    | 14 |
| Gil Sones VK3AUI                       |    |
| Variable Capacitors Made From Trimmers | 20 |
| Drew Diamond VK3XU                     |    |

### General

|   |    |
|---|----|
| Jay Carr W6FAY/VK6FG and "Desert Storm" | 16 |
| John Hawkins VK6HQ                      |    |
| TEN-TEC Tennessee                       | 18 |
| John Hawkins VK6HQ                      |    |
| Amateur Radio Annual Index 1994         | 22 |

### Operating

|  |    |
|--|----|
| Awards                                   |    |
| Worked Rockhampton Award                 | 34 |
| Kuwait National and Liberation Day Award | 34 |
| Vanuatu Award                            | 34 |
| The Diploma RAEM                         | 34 |
| Suriname Award                           | 34 |

### Contests

|   |    |
|---|----|
| UBA SSB/CW HF Contest                             | 35 |
| PACC CW/SSB DX Contest                            | 35 |
| Spanish RTTY Contest                              | 35 |
| ARRL DX Contest                                   | 36 |
| RSGB 7 MHz CW Contest                             | 36 |
| Results of 1994 7 MHz RSGB Contest                | 36 |
| Results of 1994 West Australian SSB & CW Contests | 36 |
| Results of 1994 ANARTS World Wide RTTY Contest    | 36 |

### Columns

|                       |    |                              |                       |
|-----------------------|----|------------------------------|-----------------------|
| Advertisers Index     | 56 | How's DX?                    | 40                    |
| ALARA                 | 30 | Over To You                  | 44                    |
| AMSAT Australia       | 31 | Pounding Brass               | 45                    |
| An Old Timer Reflects | 43 | QSP News                     | 11                    |
| Divisional Notes      |    | Repeater Link                | 47                    |
| VK2 Notes             | 37 | Silent Keys                  | 51                    |
| VK6 Notes             | 38 | Spotlight on SWLing          | 54                    |
| VK7 Notes             | 38 | VHF/UHF — An Expanding World | 49                    |
| Editor's Comment      | 2  | VK QSL Bureaux               | 56                    |
| Federal QSP           | 2  | What's New                   | 26                    |
| FTAC Notes            | 39 | WIA News                     | 6, 15, 21, 36, 44, 48 |
| Hamads                | 54 | WIA — Divisional Directory   | 3                     |
| HF Predictions        | 52 | WIA — Federal Directory      | 2                     |

### Cover

One of the rare occasions on which *Amateur Radio* Editor, Bill Rice VK3ABP, could be found at the operating position in his largely homebrew shack.

## Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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## Federal QSP

Early in October 1994 the \$40,000,000 seven hundred tonne catamaran *Condor II* ploughed on to a reef known as Black Jack Rocks near the mouth of the Derwent River near Hobart.

At the time of the impact the vessel was undertaking its sea trials and was travelling at a speed of 36 knots. After six weeks, salvage operations costing approximately \$2,000,000 have finally refloated the vessel satisfactorily, much to the credit of all concerned.

Through the kind services of a local amateur, Maurice Potter VK7SA, who gave a ball by ball description of the operations which was relayed over the State via amateur radio on the two metre link on Repeater 13, amateur radio eclipsed the media with on-the-spot news. Maurice was ably assisted by Bill Reid VK7WR and Brian Morgan VK7RR when Maurice was unable to attend through work commitments. A most commendable and unselfish effort by these three people. Thank you. This was amateur radio at its best, without fuss or bother, relaying the facts as they came to hand to many interested people who responded with loads of questions and complimentary remarks.

The VK7 Division is embarking on a recruiting campaign using displays depicting amateur radio. These displays will be at various vantage points in the business area of Hobart. We are looking forward to receiving numerous queries from the public at large.

Another bonus envisaged is that the displays will also act as a publicity campaign, enlightening people about amateur radio. It is hoped this will increase our membership as numbers have been somewhat static over many years. Our new clubrooms in the South have been a great success, particularly on a Wednesday afternoon when we have a social gathering and welcome any of our amateur friends from the mainland visiting the State.

**Ted Beard VK7EB**  
VK7 Divisional Secretary  
ar

## Editor's Comment

### Need for Material

There is a letter in the *Over to You* section of this issue complaining about a dearth of articles in *Amateur Radio* magazine for Novices. Looking back over the last few years we must admit that there has been little technical material published for the radio beginner and progressing up to at least the Novice licence standard.

Years ago we had a column called *Newcomer's Notebook* which ran for at least a decade, and was then replaced by *Novice Notes*, by a different author, which also ran for many

**Continued on page 3**

## Continued from page 2

years. It is a great pity that we have not been able to publish such a column for at least the last five years.

Why don't we publish a Novice column now? As footnoted to our dissatisfied reader, simply because no one has volunteered to write one for us. We (that is, all the people you see listed on the left hand side of page one) don't write this magazine! We put it together from material sent in by our regular columnists and (less regularly) from many of you, our members and readers. It is **YOUR** magazine!

So, is it possible that among you who have only recently become Novices, there may be some who would like to re-activate a Novice column? Those of us who have been licensed for decades, cannot do it,

because most of your problems and their answers were part of our early education and have now become subconscious knowledge. We have forgotten how to identify with beginner's problems.

So, do we have any volunteers? We would love to hear from you.

On a related theme, we have noticed over the last few months that our backlog of not yet published technical articles is getting smaller. That's good news for those who are wondering if their magnificent contribution will ever be printed! But it does mean that we would like to see some "new stuff" coming in. It's much better to have a backlog than for the barrel to be empty. Once *Amateur Radio* was full of reprints from overseas magazines, but for many years now we have had

sufficient input from you, our readers **AND** contributors! Let's keep it that way.

And finally, the supply of good front-cover photographs is also drying up. I doubt if we have ever had a surplus in that area, but we would certainly like to see some more. Some months we have been so desperate that you have barely escaped getting a photo of your Editor on the cover! Surely you don't want that inflicted on you, do you? So, how can you escape again?

Thank you all in advance for sending in marvellous cover photos in self-defence! (*Alias! Your contributions were too late for this issue! Assistant Editor.*)

**Bill Rice VK3ABP**  
Editor  
ar

## WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually in their residential State or Territory, and each Division looks after amateur radio affairs within its area.

| Division | Address  | Officers  | Weekly News Broadcasts   | 1995 Fees   |
|----------|--|---|--|---|
| VK1      | ACT Division<br>GPO Box 500<br>Canberra ACT 2601<br>Phone (06) 247 7006  | President<br>Secretary<br>Treasurer<br>Rob Apathy<br>Len Jones<br>Don Hume  | VK1KRA<br>VK1NLJ<br>VK1IDH<br>3.570 MHz LSB. 146.950 MHz FM, 438.525 MHz FM each Monday evening (except the fourth Monday) commencing at 8.00 pm. Repeated on Wednesday evening at 8.00 pm on 146.950 MHz FM.  | (F) \$70.00<br>(G) (S) \$56.00<br>(X) \$42.00                           |
| VK2      | NSW Division<br>109 Wigram Street<br>Parramatta NSW<br>(PO Box 1068<br>Parramatta 2124)<br>Phone (02) 899 2417<br>Freecall 1800 817 644<br>Fax (02) 633 1525 | President<br>Secretary<br>Treasurer<br>Michael Corbin<br>Pete Chapple<br>Terry Ryeland<br>(Office hours Mon-Fri 11.00-14.00<br>Mon 1900-2100) | VK2PFO<br>VK2KPC<br>VK2UX<br>From VK2WI 1.845, 3.595, 7.146*, 10.125, 24.950, 28.320, 52.120, 52.525, 144.150, 147.000, 438.525, 1281.750 (*morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay on 2 m or 70 cm repeaters. Sunday 1000 and 1930. Highlights included in VK2AWX Newcastle news, Monday 1930 on 3.593 plus 10 m, 2m, 70 cm, 23 cm. Voice mail highlights on (02) 724 5793. The broadcast text is available on packet. | (F) \$66.75<br>(G) (S) \$53.40<br>(X) \$38.75                           |
| VK3      | Victorian Division<br>403 Victoria Boulevard<br>Ashburton VIC 3147<br>Phone (03) 885 9261  | President<br>Secretary<br>Treasurer<br>Jim Linton<br>Barry Wilton<br>Rob Hailey<br>(Office hours Tue & Thur 0830-1530)                        | VK3PC<br>VK3XV<br>VK3XZL<br>1.840MHz AM, 3.615LSB, 7.085LSB, 53.900 FM(R) Mt Dandenong, 146.700 FM(R) Mt Dandenong, 146.800 FM(R) Mildura, 146.900 FM(R) Swan Hill, 147.225 FM(R) Mt Baw Baw, 147.250 FM(R) Mt Macedon, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday.  | (F) \$72.00<br>(G) (S) \$58.00<br>(X) \$44.00                           |
| VK4      | Queensland Division<br>GPO Box 638<br>Brisbane QLD 4001<br>Phone (07) 284 9075   | President<br>Secretary<br>Treasurer<br>Lance Bickford<br>Rodger Bingham   | VK4ZAZ<br>VK4HD<br>1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz, 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.805 & 147.150 MHz, 1930 Monday  | (F) \$72.00<br>(G) (S) \$58.00<br>(X) \$44.00                           |
| VK5      | South Australian Division<br>34 West Thebarton Road<br>Thebarton SA 5031<br>(GPO Box 1234<br>Adelaide SA 5001)<br>Phone (08) 352 3428                        | President<br>Secretary<br>Treasurer<br>Garry Herden<br>Maurie Hooper<br>Bill Wardrop  | VK5ZK<br>VK5EA<br>VK5AWM<br>1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.000 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT) 3.555, 7065, 10125, 146.700, 0900 hrs Sunday  | (F) \$72.00<br>(G) (S) \$58.00<br>(X) \$44.00                           |
| VK6      | West Australian Division<br>PO Box 10<br>West Perth WA 6872<br>Phone (09) 434 3283   | President<br>Secretary<br>Treasurer<br>Cliff Bastin<br>Ray Spargo<br>Bruce Hendland-Thomes  | VK6LZ<br>VK6RR<br>VK6OO<br>146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 1.825 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525 MHz. Country relays 3.582, 147.350(R) Busseton 146.900(R) Mt William (Bunbury) 147.225(R), 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker broadcast repeated on 146.700 at 1900 hrs.   | (F) \$60.75<br>(G) (S) \$48.60<br>(X) \$32.75                           |
| VK7      | Tasmanian Division<br>148 Derwent Avenue<br>Lindisfarne TAS 7015<br>Phone (002) 43 8435  | President<br>Secretary<br>Treasurer<br>Andrew Dixon<br>Ted Beard<br>Phil Harbeck  | VK7GL<br>VK7EB<br>VK7PU<br>146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNV), 3.570, 7.090, 14.130, 52.100, 144.150 (Hobart) Repeated Tues 3.590 at 1930 hrs  | (F) \$69.00<br>(G) (S) \$55.85<br>(X) \$40.00                           |
| VK8      | (Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).   |   | Membership Grades<br>Full (F)<br>Needy (G)<br>Student (S)<br>Non receipt of AR (X)   | Three-year membership available to (F) (G) (X) grades at fee x 3 times. |

Note: All times are local. All frequencies MHz.



frequency determining parts of the VFO circuit must be polystyrene to minimise frequency shift due to temperature variations. The simple VFO is not up to commercial standards, but is good enough to listen to an SSB QSO without having to adjust the dial after an initial 2 minute warm-up. I measured the drift at 200 Hz in 30 minutes with the VFO set at 7555 kHz to receive at 7100 kHz. The VFO was tested at other dial settings with much the same results.

That's the good news. The bad news is that 1N914 diodes are temperature sensitive. The dial does not always correspond to the previous setting when the set is turned on. It does, however, stabilise after a short period after switch on to within a kHz or two.

During the initial development it was found that, with a single 4-40 pF trimmer across L1, the frequency coverage was only 55 kHz. To cover the band on 40 metres, 6 presets would be required. It's even worse on 80 metres, with just 40 kHz of coverage. This is presumably

because of the higher LC ratio of the tuned circuit. I tried using diodes in parallel, but that was unsatisfactory due to increased temperature drift.

*"good enough . . .  
SSB . . . after . . .  
2 minute warm-up"*

I have limited my frequency coverage to 150 kHz on 40 metres which, in practice, turns out to be 7000 kHz to 7164 kHz in 3 steps. By using 3 pre-set trimmers, diode switching via a 3 position switch, and screened cables coupled to 0.75 volts which is RF bypassed to ground, the pre-set trimmers allow the band to be covered in 50 kHz segments with about 5 kHz overlap. Each trimmer, when adjusted, has an effect on the next trimmer in line, so readjustment is required until about 5 kHz overlap is obtained. The VFO is running at 7455 kHz at its lowest frequency in the 40 metre model (3955 kHz on 80 m). Small variations in circuit stray

capacitance can mean a large frequency shift; use the shortest possible leads and build the VFO on a separate piece of Veroboard from the main receiver. Output is taken from the second MPF102 buffer/amplifier via a 27 pF capacitor.

The mixer is a common MFE131 dual gate FET with the incoming signal on G1 and the high side VFO injection on G2 (455 kHz above signal in). The gain is controlled by the 1 MΩ pot to ground in the source lead of the mixer. The resulting difference frequency is selected from the drain of the MFE131 mixer by the first IF transformer.

The IFs are miniature types as used in portable AM radios. They are usually supplied in a pack of four. The oscillator coil has a red core. Set this coil aside for modification later. Different packs contained different colour combinations for IFs: eg two white, one black. Some had two yellow and one blue coil, but all had a red oscillator coil. Most packs supplied details for first, second and third IF coils. In practice it did not

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**Hy-Gain AR40**

For small communication antennas up to 28m, the AR40 is an economical rotator using a disc brake and low voltage control. Ideal for medium size VHF/UHF arrays.

- Dual 12 ball bearing race
- Automatic position sensor
- Fully automatic control
- Solid state control
- Low voltage operation
- Includes lower mast support



**Hy-Gain CD4511**

The same external dimensions as the AR40 but heavier duty, the CD4511 will handle a 4 element tri-bander or that bigger VHF array with ease.

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- Diecast ring gear
- Stamped steel gear drive system
- Illuminated directional indicator
- Low voltage control
- Includes lower mast support



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Heavy duty antennas, such as large tribanders and big HF monobanders need a heavy duty rotator, like the HAM-IV with its wedge brake.

- New high strength ring gear
- Dual 98 ball bearing race
- Electric locking steel wedge brake
- Illuminated directional indicator
- Remote regulated control circuit
- Lower mast support optional



**Hy-Gain T-X Tailtwister**

For multiple HF antenna arrays or HF+VHF arrays the T-X Tailtwister has the grunt to handle the big jobs!

- Thickwall castings for large load handling
- 138 ball bearings
- Triple bearing race
- Machined hardened steel drive gear
- Electric locking steel wedge brake
- Low voltage control
- Lower mast support optional

AR40 rotator

**\$503**

CD4511 rotator

**\$704**

HAM-IV rotator

**\$997**

T-X Tailtwister rotator

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seem to make much difference where they were placed in the circuit.

Next is the IF filter which is made using four SFD455 ceramic elements. This filter sets the selectivity of the receiver which turned out to be 2.8 kHz when tested. The resonators are viewed from the top as if they are transparent. The polarising circle is shown between the pins that are bridged by the 27 pF capacitor on the same resonator. Each resonator is connected to the next by the pins opposite the circle; see the circuit for details of interconnection. Keep the interconnections as short as possible to limit stray capacitance that may affect the bandwidth of the filter. The SFD455 and the CSB455E used in the BFO may be a little difficult to find (refer to the parts list for possible suppliers).

The output of the filter is coupled to the second IF transformer and then to the MPF102 product detector. Another MPF102 is used for the beat frequency oscillator using a two pin CSB455E ceramic resonator as the frequency determining element. The output is injected into the source of the product detector. The BFO frequency is set by the 3-30 pF trimmer shunted across the resonator. Tune for the best sound on a lower sideband signal. When I measured the BFO frequency I found it to be around 456.3 kHz.

An audio signal is derived from the product detector drain, then coupled to a UA741 IC, where it is amplified and used to drive a pair of low impedance headphones.

To complete and align the receiver, the following equipment is needed: a multimeter, a frequency meter or signal generator, and a GDO to get you in the ball park. A reasonable amount of patience is needed to finish what you have started. The completed receiver was built on plain, unclad Veroboard. This was hard wired and housed in a commercial instrument case. The all up cost as at January 1994 was \$105. The power required is 12 volts DC at 65 ma.

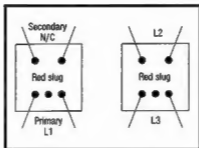
No more excuses. All the parts are reasonably available except for the resonators which were supplied by D. Dauner (refer to the parts list). Best of luck. A companion transmitter will be described soon.

Happy home brewing.

## Parts List

This is a list of the major components used in the construction of this receiver and where I obtained them. I have not individually listed the minor components as they are obtainable at most good electronic stores.

|                                     |            |  |
|-------------------------------------|------------|--|
| Vernier dial 50 mm diam.            | Dick Smith | Cat No P7170                             |
| Unclad punched board (Vero)         | Jaycar     | Cat No HP9562                            |
| Coil Formers L1, 2, 3 Neosid        | Jaycar     | Cat No LF1224                            |
| Ferrite slugs Type F16              | Jaycar     | Cat No LF1226                            |
| Winding wire 0.5 mm/24 B&S/25       | SWG Jaycar | Cat No WW4016                            |
| Screened cable RG174 Teflon         | Dick Smith | Cat No W2088                             |
| 4-40 pF ceramic trimmer             | Jaycar     | Cat No RV5726                            |
| 1N914 diode pack 50                 | Tandy      | Cat No 276-1620                          |
| Pack assorted RF chokes             | Jaycar     | Cat No RC5600                            |
| Styrofoam or polystyrene capacitors | Jaycar     | Cat No RS5526/32/48                      |
| Zener diodes 1N4739 9.1 V pack of 2 | Tandy      | Cat No 276-562                           |
| MFE131 dual gate FET                | Dick Smith | Cat No Z1849                             |
| MPF102 J FET                        | Dick Smith | Cat No Z1832                             |
| UA741 OP amp                        | Dick Smith | Cat No Z6382                             |
| Mini IF pack 455 kHz                | Jaycar     | Cat No LF1050                            |
| 10 K linear taper pot VFO tune      | Tandy      | Cat No 271-1715                          |
| Headphones                          | Jaycar     | Cat No AA2016                            |
| CSB455E & SFD455 ceramic resonators | D. Dauner  | Phone (02) 724 6982<br>Fax (02) 725 7850 |



## Coil Data

- 40 metres L1 30 turns close wound  
L2 8 turns close wound over earth end of L3  
L3 25 turns close wound

All coils are wound with 0.5 mm enamel copper wire on Neosid formers fitted with F16 slugs. Resonate L3 in the 40 metre band, fit a 100 pF fixed capacitor

In parallel with the inductor, use the GDO set to 40 metres to tune the slug for a dip, use loose coupling for the best dip, remove the capacitor when tuned. It may also be tuned by wiring a 68 pF cap and a 4-40 pF trimmer in parallel with L3, tuning the trimmer for a dip as before.

80 metres Select 2 spare oscillator coils (red slug) from mini coil packs.

L1 Secondary coil is left unused.

Primary resonates at 4 MHz with 20 pF in parallel tune with 4-40 trimmer as per circuit.

L2/3 use Oscillator coils, resonate L3 at 3.6 MHz with 33 pF in parallel with secondary, tune to frequency with the 4-40 pF trimmer.

\*51 Meeks Crescent, Faulconbridge NSW 2776  
ar

## WIA News

### New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of November 1994.

L70125 MR M P POWELL  
VK3AMG MR M GIETMAN  
VK3KEG MR T PITMAN

VK3KRS MR R SHAW  
VK3PXJ MR J K WATERS  
VK3XKU MR N PENDLEBURY  
VK3YMG MR A D JOHNSON  
VK6BHV MR R LIYANAPATHIRANA  
VK6BKZ MR J J OLIVERO  
VK6CV MR A J PRESTON  
VK7CA MR M PRIESTLEY

## ■ Technical

# Capacitors At High RF Power

Lloyd Butler VK5BR\* shares with us much useful knowledge about fixed capacitors in transmitting circuits.

### Introduction

In some of my articles on the Z Match Tuner, I referred to the use of high voltage fixed capacitors to achieve matching at 1.8 MHz. I discussed rated voltage but there are other factors which have to be considered in choosing a capacitor to operate in a high power RF circuit. I thought it would be useful to prepare a few notes on this subject.

### Rated Current

Whilst the dominant impedance component in a capacitor is capacitive reactance, also included is a small resistance component caused by resistance in the electrode assembly and losses in the dielectric. When an AC voltage is applied across the capacitor plates, a reactive current flows, essentially equal to the applied voltage divided by the

capacitive reactance. The point of interest is that heat is developed in the capacitor by this current passing through the resistance. As the reactance is inversely proportional to frequency, the current increases with frequency and hence the heat dissipation increases with frequency. Excessive rise in temperature caused by excessive heat can destroy the capacitor and a capacitor made for RF power applications, with high developed voltage, also has a maximum AC current rating.

At low frequencies, the limiting rating factor is the voltage across the capacitor plates. However, there is a frequency for a given capacitor above which the limiting factor is the current through it. Above this point, the voltage which can be applied must be lowered inversely with frequency so that the reactive current does not exceed the rated limit.

Let's take the typical case of our Z match at 1.8 MHz where a fixed capacitor of around 1000 pF is connected as part of the input capacitance and a fixed capacitor of 400 pF is connected across the coil. When the tuning unit is properly matched to load 50 ohms and the power is 400 watts, an RMS voltage of around 250 might be developed across the input capacitor and an RMS voltage of around 350 might be developed across the shunt capacitor. At 1.8 MHz, the 1000 pF capacitor has a reactance of 88 ohms and the 400 pF capacitor has a reactance of 220 ohms. The respective RMS currents are then worked out as  $250/88 = 3$  amps and  $350/220 = 1.6$  amps.

Allowing for the peak value of voltage and a 50% margin, we might seek a voltage rating of around 540 V for the input capacitor and around 750 V for the shunt capacitor with RMS current ratings of around 3 A and 2 A respectively.

### Mica Capacitors

Muscovite mica is an excellent low loss dielectric material and mica dielectric capacitors have been around since the early days of radio. Mica capacitors have high insulation resistance, low power factor and are frequency and temperature stable. They perform well up to frequencies of 500 MHz and, made to an appropriate size, can handle large RF currents and high voltages. For many years they have been used in transmitting applications.

Basically, there are two types of mica capacitors. The stacked foil unit consists of alternate layers of metal foil electrodes separated with sheet mica insulators. These are sometimes marked "MS" for stacked mica. The silver mica type, sometimes marked "SM", have a silver electrode material screened on the mica stampings which form the electrodes. The silver mica type have very high stability and are highly recommended for use in oscillators and other critical applications requiring stable capacitance. However, they do not withstand high RF currents and for circuits where there are high RF voltages or currents, the stacked foil unit should be used.

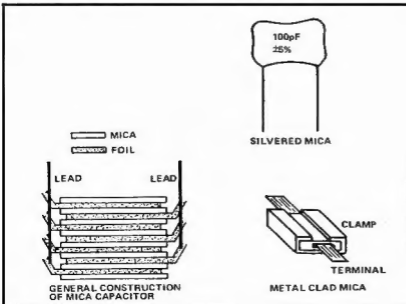


Figure 1 Mica Capacitors.

High voltage mica capacitors are ideal for the RF power application but these days, it is difficult to buy a mica capacitor of any sort from the local electronic store. They seem to have disappeared from the catalogues, apparently superseded by capacitors using dielectrics of synthetic material. Furthermore the stores no longer seem to cater for high voltage or high power RF components of any sort. The source of supply is the amateur radio trading marts or electronic sales. All sorts of valuable junk changes hands — valuable because you can't buy it anywhere else.

High voltage mica capacitors specifically made for high RF power often have the current rating printed on their case together with the voltage rating. If there is nothing to define the current rating and there is voltage rating well above that required, the chances are that at the low frequency of 1.8 MHz, current will not be a problem.

## Ceramic Capacitors

Whilst radio transmitters of early vintage used mica dielectric capacitors in their high power RF circuits, transmitters of more recent vintage have used ceramic dielectric capacitors specially made to withstand the high voltage and high currents inherent in the circuitry. These capacitors are somewhat larger than the common forms of ceramic capacitor and are invariably of disc or tubular construction. I have found an interesting introduction to these capacitors from a catalogue distributed by Unilator Technical Ceramics who manufacture ceramic capacitors. They refer not only to a voltage and current rating but also a reactive volt/amp (VAR) rating, the product of the two. The following paragraphs are extracted from their catalogue:

*Power capacitors can be defined as capacitors suitable for radio frequency use with reactive powers in excess of 1 KVAR, 1 amp RMS and rated voltage above 700 volts peak.*

*The electrical performance is determined by the current and power ratings. These parameters are interdependent as specified by the equations:*

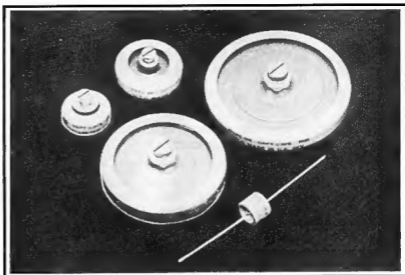


Figure 2 High voltage ceramic disc capacitors.

$$VA_R = V^2 2\pi f C \quad (1)$$

$$VA_R = \frac{I^2}{2\pi f C} \quad (2)$$

$$VA_R = \text{Reactive Power}$$

$$V = \text{Voltage (volts)}$$

$$I = \text{Current (amps)}$$

$$C = \text{Capacitance (farads)}$$

$$f = \text{Frequency (Hz)}$$

*When a power capacitor is subjected to an RF load heat is generated in the dielectric due to internal losses and in the electrode system due to resistance heating. Depending on the applied power the temperature of the capacitor will rise until either:*

- (1) *thermal stability is reached; or*
- (2) *thermal runaway occurs resulting in destruction of the capacitor.*

*In practice, the maximum temperature of the capacitor should not exceed 95 degrees C. The performance is characterised by a typical reactive power versus frequency load curve as shown in figure 3. The curve can be split into three distinct zones:*

- (1) *In Zone 1, the power rating is determined by the voltage rating of the capacitor. Below frequency f1 it is neither possible to operate the capacitors at maximum*

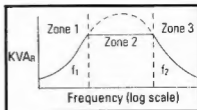


Figure 3 The reactive power versus frequency curve of the ceramic capacitor can be split into three distinct zones.

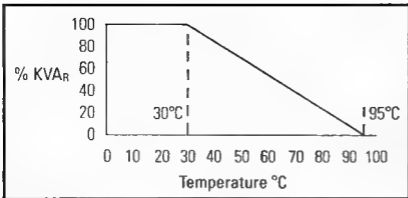
*reactive power nor maximum current ratings.*

- (2) *In Zone 2, the reactive power rating is limited by the temperature rise in the capacitor. Above f1, the maximum voltage that can be applied will decrease with frequency.*
- (3) *In Zone 3, the reactive power rating is determined by the current rating of the capacitor. Above frequency f2, it is neither possible to operate the capacitor at maximum voltage nor maximum reactive power ratings.*

*For any given capacitor ratings, the frequencies f1 and f2 can easily be calculated using equations (1) and (2).*

*Ratings are defined as follows:*

- (1) *The voltage rating is either the peak AC, the peak AC+DC, or the DC voltage for which the capacitor is designed.*
- (2) *The reactive power rating is such that capacitor temperature rise shall not exceed 45 degrees C*



## Summary

This article has been prepared simply to alert the unwary that in selecting a fixed capacitor for high RF power, there is a little more to consider than just the voltage developed and the voltage rating of the capacitor. Capacitors have internal losses which amount to heat dissipated when alternating current is passed through them. Hence the rated current and the amount of heat dissipation must also be considered. Capacitors with low dielectric loss and ability to withstand a temperature rise are desirable.

Two types of capacitor suitable for high power RF have been identified as the stacked foil mica and the high voltage disc or tubular ceramic capacitor. Perhaps there are other suitable capacitors which someone else, with specialised component knowledge, might like to identify through the columns of *Amateur Radio*.

\*18 Ottawa Avenue, Panorama SA 5041

■

when operated at an ambient temperature of 30 degrees C.

(3) The current rating is the RMS current for which the capacitor is designed.

If capacitors are operated in an ambient temperature higher than 30 degrees C, then the reactive power rating must be reduced as shown in figure 4.

There is a lot more in the catalogue but I think those paragraphs provide an excellent introduction on how the ratings of high voltage/high power ceramic capacitors are used. I am out of touch these days with information concerning source of supply of these special capacitors but perhaps some of our readers might be able to supply *Amateur Radio* with that information.

**Strictly Ham Pty. Ltd.** ACN 088 638 407

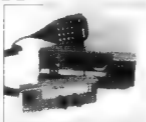
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## ■ Technical

# QRP — The Art of Low Power Operation

David "Doc" Wescombe-Down VK4CMY/VK5HP\* gives some clues to success with low power.

If you respond to a challenge and frustration, possess a reasonable degree of operating skill and have infinite patience, then low power operation on CW or SSB may be a pleasant change for you, even in these days of inferior propagation.

My own activity in QRP since 1975 has involved 10,000 plus QSOs using 5 watts input (or less) on CW, primarily 20 metres, with a variety of rigs:

- 6C4 driving a 5763 ("home spun")
- Heathkit HW7 and HW8
- TenTec "Argonaut 509" and "Century"
- ICOM IC-710 "wound back".

There is a healthy VK QRP Operators Club with a \$10 per year membership. Details and membership applications may be obtained from Kevin Zietz VK5AKZ, 41 Tobruk Avenue, St Marys, SA 5042. Packet address is VK5AKZ@VK5TTY.#ADL.#SA. AUSOC

The club QRP CW net operates on Tuesday nights from 0945 UTC (0845 UTC Summer Time) on 3529 kHz, or lower if QRM.

The club SSB "Natter Net", Steve VK5AIM's roster, is on Friday nights from 1030 UTC (0930 UTC Summer Time) near 3620 kHz

The VK QRP Club promotes low power CW mode operation and "homebrewing" within the amateur radio service. The quarterly journal, LO-KEY, is a source of ideas, circuits, who's who and where within the club, awards and contests, QRP kit sets, components and books

Interested? Let's find out some more.

No doubt that a high power station, given a suitable QTH and antenna system, will "get out" better, but the real value of power is often

overstated. Consider this. If an S9 signal is arriving at your end from a 1 kW transmitter, then an:

- S8 signal would emanate from a 250 W transmitter;
- S7 signal would emanate from a 62 W transmitter;
- S6 signal would emanate from a 16 W transmitter;
- S5 signal would emanate from a 4 W transmitter;
- S4 signal would emanate from a 1 W transmitter;
- S3 signal would emanate from a 250 mW transmitter;
- S2 signal would emanate from a 62 mW transmitter; and an
- S1 signal would emanate from a 16 mW transmitter.

In other words, the power level is not going to be as critical as the antenna system. Over the years, it has often been the custom to test station aerial efficiency for other operators by running QRP operation from their aerial(s) and providing resultant feedback. Be assured that many of our coax fed antennas, commercial and others, do NOT work as well as either the manufacturers claim or the owners would like to believe. That piece of information often hurts because it reflects on our ability to assemble and install and heaven forbid that I might have rushed it or misread a measurement, etc!

THE ANTENNA EFFICIENCY MAKES OR BREAKS ANY AMATEUR RADIO STATION BUT ESPECIALLY A QRP STATION!

### Antennas/Aerials

What to use? Any aerial that works on the desired frequency is suitable, but a number of construction practices need to be "spot on" and not "near enough is good enough". They include:

- conductive paste used in all telescoping joints in elements/radiators;
- resonant radiators;
- open wire line (300  $\Omega$  TV ladder or

600  $\Omega$  air-spaced lines) are much superior to coaxial cable;

- an aerial site clear of obstruction for at least a half wavelength in all directions at the desired frequency;
- elevated aerial — the higher the better,
- soldered joints, including radial wires;
- avoid conductive supports for inverted Vees and other wire aerials — they play havoc with absorption and patterns of radiation; and
- use a low loss ATU when possible.

### A QRP Station

Many commercial QRP rigs are available through Classified Advertisements or at "buy'n'sell" functions. Delicacies such as:

- SHIMIZU 105S (ex Dick Smith, several years back)
- TENTEC "ARGONAUT 509" "PM" Series
- HEATHKIT HW7, HW8 and HW9
- MFJ-40T
- KANTRONICS "Rockhound"

appear from time to time but these units are at a premium level of demand because most are no longer manufactured. The QRP Club journal, *Amateur Radio*, *Amateur Radio Action* and your local private *Trading Post* paper would be good areas to run a "Wanted to Buy" advertisement.

"Rolling your own" can be a very worthwhile project and a number of designs, bits and components are readily available locally (again consult the QRP journal)

A VFO is essential, in my opinion, for serious DX work as crystal operation becomes too restrictive for hooking up with DXpedition activity and also avoiding the illegal QRM that prevails in our bands.

Receivers can be separate or part of the QRP rig depending on your situation.

## QRP Operating

The difference between success or not in low power operation, notwithstanding aerial efficiency, is operating skill. My experience would suggest these few tips:

- indicate you are a low power station by adding QRP after your call. DXpeditions and most QRO operators are very mindful of the meaning and it will often give you a "priority" over other callers.
- check the band conditions to pick the right time for operating. I often listen around the bands I work (80, 40, 20 metres) but finish up gardening, reading, writing or being seconded to other chores simply because it won't be worth trying to operate.
- Choose your band with care. 80 m and 160 m static levels are high; 20 m is "kilowatt alley" but 40 m (apart from the fishing boat SSB

QRM up to 7005 kHz) is usually OK. 15 m and 10 m in times of better sunspot activity can be really brilliant, but then you may have to wait a while for them to produce their best.

- Know the right frequencies. Popular CW spots are 1810, 3540, 3560, 7040, 7060, 14060, 21040, 21060, 28040 and 50360 kHz.
- Call on the caller's frequency. This may sound rather obvious, but it highlights a disadvantage of Xtal control.
- Listen before calling. In QRP operation, if you get serious about it, you will probably do 10 times as much listening as transmitting.
- Send a little slower than usual on CW and speak clearly on SSB using STANDARD PHONETICS. Bear in mind that someone at the other end may be really straining

to pull you in, so give them all the help you can.

## Conclusion

QRP operation is not everybody's cup of tea but I think that is the major strength of our hobby — we can each do our own "thing". It is, however, low cost with high achievements. My own QTH has no mains power, so I use a 40 AH car battery to run the HW8 and the IC710, but I have a lot of fun and work many stations, both local and overseas. My aerial is a half wave ground plane with 120 half wave radials and fed with 300 ohm TV ladder line through a home brewed Z-match. Not flash at all, but as anyone who has worked me will tell you, QRP GETS OUT!

Best of luck and I would enjoy meeting you on QRP soon.

*\*C/O PO Dalveen QLD 4374*

## QSP News

### 80 Metre DX Window

#### Statement from SMA on Out-of-Band Operation

The SMA has issued a statement explaining the meaning of the regulations as they apply to the 80 metre DX window. The statement is as follows:

*"The 80 metre DX window (3794-3800 kHz) is set aside for use by the amateur service in Australia on a secondary (non-interference) basis and is specified in Australian footnote AUS8 of the Australian Spectrum Plan (Statutory Rules 1990 No 413). This band is available for use by unrestricted amateur licensees only and is conditional upon the avoidance of operation within 1 kHz of 3794 kHz, which in effect reduces the band to 3795-3800 kHz. Amateur licensees must ensure that their transmissions are wholly contained within the band.*

*"When using lower sideband*

*emission for voice transmission, as is customary for amateur operation on 80 metres, care must be taken to ensure that the transmitted sidebands do not extend below 3795 kHz. Consequently, depending on the transmitted audio bandwidth, the operating (carrier) frequency may be limited to approximately 3798 — 3800 kHz. Other modes of transmission which occupy less spectrum (such as CW) permit closer operation to the 3795 kHz lower limit.*

*"Within Australia, the spectrum immediately below the 80 metre DX window is occupied by a number of primary services. It is important that these services do not receive interference from out-of-band amateur transmissions.*

*"I trust that this information settles any disputes regarding the use of this band."*

The letter (SMA ref No X94/1358) was signed by Mr Peter Allen, Acting Manager, Technical

Services Team, Customer Services Group of the SMA in Canberra. It should be understood that this explanation does not represent any change to our licence conditions or any toughening of the rules relating to the DX window. The regulations as set out in RIB71 are the same now as they were when the DX window was introduced in 1983. Unfortunately, the rules have been misunderstood and many amateurs have been operating out of band for some time, in the belief that they were operating legally.

The rules may change in the future and it is possible that the DX window will be expanded. In the meantime we are required to abide by the rules as they stand. This is not easy in such a narrow window but there is no alternative.

**John Martin VK2KWA**  
Chairman Federal Technical  
Advisory Committee

## ■ Antennas

# Random Radiators

with Ron Cook VK3AFW and Ron Fisher VK3OM\*



Ron's Hiace van parked at The Devil's Marbles in the Northern Territory. The Hustler antenna is mounted on the bull bars to the passenger's side of the spare wheel, and the Global whip is gutter mounted over the passenger side front door.

First off, we must apologise for the lack of *Random Radiators* over the last few months. Both of us have been travelling far and wide and each was relying on the other to produce the column. Sorry, we promise to be more regular in the future.

### Mobile HF Antennas — How Well Do They Work?

If you read the *Editor's Comment* (we hope you do) you will have noted that one of the Rons has undertaken an around Australia trip. This, of course, was a great opportunity to play around with a few different antennas and assess their relative merits. I now intend to change to the singular person as only one of us went. You can figure out who "I" is by checking the *Editor's Comment* of a few months ago.

Anyhow, I have enjoyed portable and mobile operation for the last 40 years, starting off with an AM transmitter on 40 metres into a centre loaded whip. The receiver in those

days was a two tube crystal locked converter feeding into the car broadcast receiver. These were actually described in *Amateur Radio* circa 1956. At some time in between then and now I acquired an American Hustler mobile antenna set. It's so long ago, I've forgotten just when this occurred. The Hustler has worked very well over the years and has been around Australia twice.

Just before setting out on our latest expedition, Adrian VK2DZF announced the release of his "Global" series of HF whips. Adrian has been a long-time contributor to *Amateur Radio* with many interesting antenna articles. I suggested that it would be a good idea if I took a sample of his new whips along on our trip and made a few on air tests with them. This I did and came up with some very interesting results.

But first I will hand over to Adrian to describe the construction and theory of operation of the Global antennas. "Most mobile HF antennas

will perform a lot better if they can be located high on the motor vehicle. This not only puts the antenna well in the clear but also keeps the feed point as far as possible from ground level. These new high performance mobile whips are designed to be located high on the vehicle, at roof or boot level and, because of their relatively slim design and two piece construction, the eye tends not to see the total length. This gives the antenna an advantage over other designs that cannot be located in these preferred locations because of either size, design or because it just looks too ugly.

### Global HF Whips, Technical Description

They are a resonant centre loaded two piece slim design using a fibreglass rod with stainless steel top half. The bottom section is covered in non RF sensitive black heat shrink tubing.

Excellent bandwidth is achieved with most bands above and including the 20 metre models. The two 20 metre models show a VSWR of 1:1 and have a better bandwidth with the shunt capacitor installed for the antenna to show 50 ohms impedance. The 80, 40 and 30 metre antennas must have the shunt capacitor installed for the antennas to show 50 ohms impedance. This is normal for physically short antennas. The MFJ-910 is a commercial device specially designed for this purpose (available from Daycom) and the capacitors can be by-passed for the higher frequency bands as required.

Resonance is determined with the shunt capacitor in circuit for 30, 40 and 80 metres. The capacitance values and SWR readings were obtained using a feed line length of 7 metres (23 feet) as installed in the test vehicle. The capacitor box should be located 60 cm (2 feet) or less from the antenna feed point."

### The Global Antennas On Test

My old Hustler was mounted on the bull bar in front of our Toyota Hiace camper van. Possibly this is by no means an ideal position as it is shielded by the van in almost every direction except straight ahead.

However, results over the last few years have been satisfactory.

The Global was mounted at gutter level using a standard gutter mount. In fact, this mount was also used for the two metre whip with the antennas being swapped around according to needs at the time. Both were fed with RG-58 coax of around 4 metres in length. The matching capacitor for the Global was connected with a couple of crocodile clips when needed.

Two other comparison antennas were available from time to time. These were a 20 metre half wave dipole fed with about 15 metres of RG-58 coax through a 1 to 1 balun. The other antenna was a 25 metre wire end fed through an Emtron EAT-300 ATU (no, I didn't take a Z match!). This antenna is very similar to the W3EDP which was described in this column some time ago.

At fixed locations this antenna performed very well with several 160 metre contacts into Melbourne from places like Ayers Rock and Alice Springs and 40 metre contacts into VK3 during daylight hours. At most times it was no higher than seven or eight metres above ground. Tests with the whips were mostly carried out around mid day when we stopped for lunch and checked into the Travellers Net on 14116 kHz.

Usually, only a narrow section of 20 metres was used with the highest frequency being about 14140 kHz for contacts back to Melbourne. When

tests were carried out, the other antenna was removed to eliminate any interaction.

So, which was the best antenna? That has to be answered in several ways. Initial tests between the Hustler and the Global usually came out in favour of the Global by, maybe, an "S" point or so. Sometimes the two received the same report but at no time did the Hustler better the Global

---

### *"tests . . . between dips in the hot springs"*

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These initial tests were carried out in the Ayers Rock area with contacts into Melbourne, Sydney and Perth. It wasn't until we got further north to Mataranka Hot Springs that a few days stay allowed longer tests to be carried out in between dips in the hot springs. I was able to put the 20 metre dipole up at about 10 metres. On the Melbourne path both whips and the dipole were almost even in signal strength but a contact into the west coast of the USA brought the dipole out the winner with a one "S" point advantage over both whips. Due to poor propagation, contacts into Europe were hard to come by from the Northern Territory but it's possible that the dipole might favour the longer

distance even more than the one "S" point to the USA.

So, what are my conclusions?

- 1 The Global whip on 20 metres is better than average
  - 2 Mobile whips can equal a dipole at 10 metres height over a two to three thousand kilometre path and not be too far behind over longer paths.
  - 3 On 40 metres, the Global whip was an "S" point behind my 25 metre wire but this is probably not conclusive as only a few short tests were tried on this band.
  - 4 The bandwidth of the Global 20 metre was excellent. The 2:1 SWR points were more than 150 kHz apart.
  - 5 The only alteration I would make to the Global would be the addition of a spring at the base. Mounted on top of a camper van, the top of the antenna is quite high. I got mixed up with a few low trees and, while the antenna didn't break, I would be happier with a spring. The Dick Smith D-4509 should be OK.
- If you want a mobile antenna that really performs I suggest you contact Adrian at Global Antennas, PO Box 344 Baulkham Hills, NSW 2153.
- And that's all for this month. See you in a couple of months. Goodbye from him and goodbye from me.

**The two Rons.**

\*C/o PO Box 2175, Caulfield Junction, VIC 3161

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# Technical Abstracts

with Gil Sones VK3AUI\*

## Dual Band VHF/UHF Antenna

An antenna which can be used on both 144 MHz and 432 MHz is useful to extend the operating range of a dual band handheld radio. In *QST* for September 1994, a dual band J pole is described by Jim Reynante KD6GLF.

The interesting thing about this design is that it is a 144 MHz design which works on its third harmonic on 432 MHz. This is different from the designs which branch out of a single pipe with separate feedlines on each band. This design, which is built out of TV 300 ohm ribbon, will, however, have different vertical radiation patterns on each band. However, if it helps you work stations further afield, you should not worry too much about the radiation pattern.

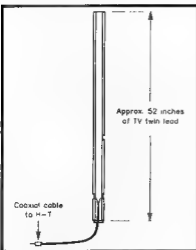


Fig 1 — J Pole Antenna.

The basic J pole is shown in Fig 1. The dimensions are in inches as this is an American design. The antenna is shown in more detail in Fig 2. In Fig 3 the attachment of the feedline is shown. To decouple the feedline you can slip some ferrite beads over it or, alternatively, wind a five turn coil using the coax on a one or two inch

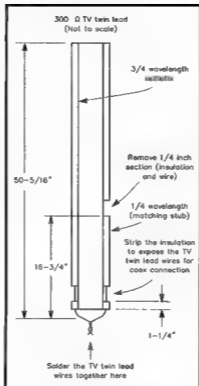


Fig 2 — J Pole Antenna showing dimensions for trimming and stripping insulation.

diameter. This choke coil should be close to the feedpoint.

If you need to adjust the SWR you should trim three times as much from the radiator as from the stub. Only do this in very small increments or you will soon have an antenna that is too short. The SWR curves claimed are shown in Fig 4 and Fig 5.

The antenna can be suspended from an insulating cord or it could be slipped into a plastic pipe radome. For anything other than a very short run of coax use RG213. At these frequencies the attenuation of RG58 and other thin coax is excessive. Even RG213 is fairly lossy at 144 and 432 MHz.

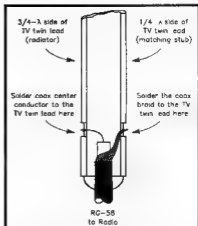


Fig 3 — Attaching the feedline. The centre conductor is attached to the longer three quarter wave side. The braid is connected to the shorter quarter wave side.

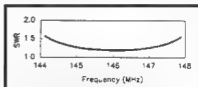


Fig 4 — Two Metre SWR Curve.

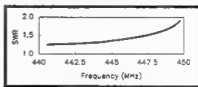


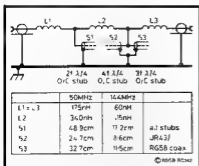
Fig 5 — 70 cm SWR Curve.

## Stub Filters

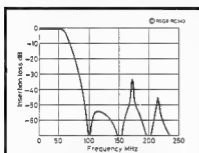
At VHF and UHF, coaxial cable stubs can be used as filter elements. They are often easier to use than lumped L and C in a filter design. Some interesting designs were published in the *RSGB* monthly journal, *Radio Communications*, for November 1994 by John Regnault G4SWX.

A stub assisted Low Pass Filter is shown in Fig 6 with values for both 50 MHz and 144 MHz. The inductors used were prewound Toko S18 coils but air wound small inductors could be used. For more than 10 watts the coils should be air wound. The coaxial cable used for the stubs was RG58.

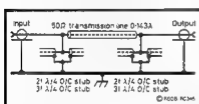
The performance of the 50 MHz filter is shown in Fig 7. Low insertion



**Fig 6 — Stub Assisted Transmitter Lowpass Filters for 50 MHz and 144 MHz.**



**Fig 7 — Measured Performance of the 50 MHz Lowpass Stub Filter.**



**Fig 8 — All Stub KISS Harmonic Filter.**

loss, together with low SWR and high harmonic rejection, is claimed for this design. The components are not specialised and it should be easily reproduced.

Another design, using coaxial cable only, was given. This is purely a harmonic filter designed to lower the harmonic output of an amplifier. The main filtering of other than harmonics is left to the filtering in the exciter. This design was originally from Ian White G3SEK.

The all coaxial cable KISS stub filter is shown in Fig 8. The length of the matching line is given in Table 1 for variants of the design. For a 144 MHz or 432 MHz design for 2nd and 3rd harmonics using RG8 or RG213 cable, the cable lengths are given in Table 2.

**Table 1**

| $\lambda/4$ Open Circuit Stubs Included | 2f    | 3f    | 2f&3f | 2f&3F&4f | 2f&3f&4f&5f |
|---|-------|-------|-------|----------|-------------|
| Length of Matching Line $\lambda$       | 0.175 | 0.205 | 0.143 | 0.125    | 0.113       |

**Table 2 — Cable lengths for 2nd and 3rd Harmonic Filter using RG8 or RG213 Cable.**

|                    | 144 MHz      | 432 MHz      |
|--------------------|--------------|--------------|
| 2nd Harmonic Stubs | 17.2 cm long | 5.7 cm long. |
| 3rd Harmonic Stubs | 11.4 cm long | 3.8 cm long. |
| Matching Section   | 19.6 cm long | 6.5 cm long. |

The use of different cables will need some variation of the lengths given. Excellent attenuation of harmonics of the order of 60 dB is possible.

### PA05SB Transceiver

I have received a translation of part of this extremely complex transceiver project from Jos Weemaes VK3DJQ. The articles describing a high performance HF transceiver have been published over a period from February 1993 in *ELECTRON* by Jan Otens PA05SB. The project is not for the inexperienced or the faint hearted as it is a very high performance design and extremely complicated.

One interesting technique used in this design is the use of a Phase

Locked Loop Integrated Circuit type 74HCT4046A as a filter to select the desired product from a mixer in the Transceiver Phase Locked Loop for the local oscillator. This was after the product had been enhanced by an image rejecting mixer which gave a 20 dB ratio between the desired product and the undesired product. The use of two phase locked loop ICs as filters for the desired product gave over 70 dB of rejection of the undesired product.

This was one of the rather novel techniques used in this complex design. I would like to thank Jos Weemaes VK3DJQ for his excellent translation.

\*C/o PO Box 2175, Caulfield Junction VIC 3151

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## WIA News

### Special Event Stations

Amateur radio will play a role in publicising the British-sponsored 1995 "Expedition Island Earth, Jason Project" which, each year, takes a team of scientists and students on a scientific expedition.

In March 1995, the Jason Project will explore the volcanic islands of Hawaii. Promotion for the expedition will be carried out at a number of UK sites, through the National Galleries and Museums.

The activities will be accompanied by several special

event amateur radio stations. In the UK, GB6JAS will focus on VHF, UHF and satellite working. Further afield, GB0JAS will be heard on the HF bands. They plan schedules with British research vessels in the North and South Atlantic, according to the event organiser, Alan Clayton G7HZZ (QTHR).

The special event stations plan to commence operations on 5 March. Further information will be available in amateur radio press and on packet radio, closer to the date.

## ■ People

# Jay Carr W6FAY/VK6FG and "DESERT STORM" — A saga of one amateur's very active life.

John Hawkins VK6HQ\*

On 15 April 1942 a PBY Catalina flying boat followed the course of the Swan River from Fremantle and aligned itself for touchdown on Perth's Crawley Bay. Both commissioned pilots observed several Catalinas moored in the placid water below. Another had been hauled from the brackish tidal flow onto dry land for maintenance.

The enlisted pilot doubling as the bomb-aimer tidied away his charts. Two mechanics sat waiting for the splash of the floats on water.

It had been a long flight. Operational needs at one point to ascend above their customary patrol height of 5,000 feet had meant the use of oxygen. There were no oxygen masks, just pipe stems at the end of rubber tubes. At 10,000 feet the cold had penetrated the aircraft and left them shivering.

As the aircraft continued to lose altitude the radio operators took last minute approach instructions. Dual receivers directed Morse to each heedful ear of Jay Carr W6FAY. In a short while he was to reunite with his buddy from Pearl Harbour days, Chuck Farkas, later to become VK6CF, but for the moment concentration came first. He was not to know that, in due course, they would both bump into Jim Rumble VK6RU serving in the Australian Army and in the Crawley Bay area.

Initial billets were in a tent city on the Esplanade. Later came more permanent but austere

accommodation on the University of WA campus, in the chemistry department.

Nevertheless, these minor hardships paled at what was to come. War never was a barrel of laughs. The Java operations for Jay were particularly nasty. There were, however, lighter moments, like the time, when with wheels down, circling Geraldton airport, Jay's Catalina avoided one landing strip crudely marked with an X believing it meant "closed". They soon discovered as they bumped and sliethered their way between sand drifts and vegetation on the other strip that X meant quite the opposite!

Then there was the time they played the game of "crazy Yanks" and came into land at Port Moresby airfield with nothing but the floats between them and terra firma. At the last moment, and with the local Aussies yelling frantically into the radio to "pull up!" and the fire tender heading out to sort out a seemingly inevitable catastrophe, down came the wheels. Catalinas had wheels too!

That was over fifty years ago.

How both Jay and Chuck met and married West Australian "sheilas" was typical of the war years. Jay married Kitty on 11 September 1943. He was 22. Kitty was, well, younger than Jay! They spent their honeymoon at Narrogin. At the end of the war, on her way to reunite with Jay in San Francisco, Kitty was on the first "bride-ship" and was photographed with other wives joining their husbands. This picture, I understand, appears in a book written about the "war brides" as they came to be called.

## Nowadays

Nowadays, Kitty and Jay live very happily in Escondido near San Diego where I had the pleasure of meeting them both last year. Chuck married Dorothy and they live very happily in Kalamunda, Western Australia, where I had the pleasure of meeting them last week. We only live one mile apart!



(l to r) Art K6XT, editor of the San Diego DX club bulletin and Jay W6FAY/VK6FG.

Despite the distances between Jay, Chuck and myself, we can talk to one another virtually whenever we please through the medium of amateur radio, although it's very pleasant once in a while to have that "eye-ball" QSO, a face to face contact with the reassurance of a handshake.

I missed catching-up with Jay in 1985. He was at the Visalia DX Convention when Connie and I were in the Los Angeles/San Diego area. I did manage a 2 m contact with him, however. We were on our last day in Chula Vista on the Mexican border when someone said Jay was back and got him to come up on the band. Sadly, we were due to fly out the next day for Albuquerque.

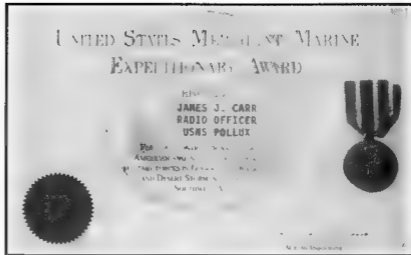
Last year there was no mistake and Jay and I had two terrific days, driving around looking at big aeriels, eating, drinking, working the radio, meeting the locals. Above all, we talked.

## Recent Career

Jay is a man who, at the age of 70, was recalled to serve in operation "Desert Storm". I kid you not. What follows can only be a thumb-nail sketch of the lead-up to how it happened. Nearly all of my notes were taken "on the run" so to speak, as time was of the essence. Jay drove, pointing out things of interest and answering my questions. I listened.

After the war Jay did a variety of jobs. For a while he was with the Jet Propulsion Laboratory at Pasadena working on the very successful soil-sampling arm for the Viking I and Viking II projects. In the mid 50s he worked on the F102 Delta Dart, then transferred to missile development on the Atlas telemetry. For a while he became self-employed doing drafting, liaison and "gofer" type work as he termed it! During the mid 60s radio officers were in demand so he spent six months or more with the merchant marine servicing the Vietnam offensive. Around 1970, Jay felt he was getting left behind by technology. He was not alone in that! He returned to the Merchant Marine until March 1988 when he retired.

Retirement was shortlived. The Merchant Marine Union had a contract for ready reserve and on or about 10 August 1990 they got in



The medal received by Jay W6FAY/VK6FG.

touch with Jay advising him that they could not muster enough personnel for Arabia and "Desert Storm". The next day Jay flew to North Carolina where 864 pieces of military equipment had just been driven onto the USNS "Pollux" and chained down. The heavier weapons they needed were on board, together with jeeps, packaged rations, water purifiers and ammo trucks packed with 7,000 tons of ammo! They were on their way.

Three hours from Wilmington the "Pollux" passed the last point of land before the open sea. From every vantage point flags waved, hundreds of cars pointed in towards the vessel with horns blaring. PA systems voiced the pride and good wishes of the multitudinous farewell party! It was a moment, Jay said, he would always remember.

The "Pollux" was a fast ship despite her twenty years. She averaged 33 knots from North Carolina via the Mediterranean, Red Sea and Gulf of Aden to Ad Damman, one hundred miles south of the Kuwaiti border, taking barely ten days to get there. Two 21 foot four-blade props driven by two steam turbines enabled her to do 37 knots if need be. She was one of the first to arrive. The assignees of the equipment had been flown in to meet the ship and within three hours, the equipment had been driven off and was supporting the 82nd, easing concerns that the Iraqis were about to cross the border unimpeded.

As you can see from the

photographs, Jay lived to tell the tale and to receive a medal for his efforts. It's still hard to believe he was 70 when the award took place.

Oddly enough, this account of Jay W6FAY, ends on a Middle East note, too. While I was in the Escondido area, Jay showed me many gigantic antenna arrays. A huge, four tower outfit belonged to Rick N6ND. There was a fine antenna farm at Dale K6UA's place. We called on Art K6XT as he prepared his seven element Long John on its 53'5" boom for placement back that weekend at 175'.

Terry W6MKB's QTH was overshadowed by a 180' tower supporting beams for just about every known band! As we stood marvelling Jay told me Terry had once stayed with JY1, King Hussein of Jordan, at His Royal Highness's invitation and had worked the CQ Worldwide Contest using the King's Drake equipment. When the time came for Terry to leave, the King had taken his watch from his wrist and presented it to Terry as a memento. Terry had not long returned to Escondido when his house was broken into and the safe containing the watch was stolen.

It was good to catch up with Jay and Kitty, to meet some more of the Californian "Big Guns" and to ponder antennas that seem to defy gravity.

Whether one's lot in life is a bitch or a bowl of roses, it has to be said that life wasn't meant to be dull and boring. Jay's *joie de vivre* radiates like a camp fire on a cold night! His 20 m CW does pretty good too . . .

\*39 Glyde Road, Lesmurdie WA 6056

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## ■ Industry

# TEN-TEC Tennessee

*John Hawkins VK6HQ\* tells of his tour of a fascinating ham radio equipment factory.*

Celebrities appearing among the amateur radio fraternity have been almost too numerous to mention. King Hussein of Jordan, Senator Barry Goldwater, Sir Brian Rix, world champion speedway rider Tommy Price. They come from all walks of life. Chet Atkins and Tex Beneke have thrilled the world with their mastery of music, whilst privately enjoying the relaxation afforded by amateur radio.

Unless you're a jazz buff you may not have heard of Chet and Tex but you must have heard of Dolly Parton. However, don't start scanning the W4 listings for "D Parton". I'm only teasing! So far as I know, the star of Dollywood is not likely to be heard calling CQ DX! But, if you ever find yourself on Dolly Parton Freeway near Sevierville, Tennessee, you'll probably have amateur radio on your mind as well as Dolly because you'd be within cooee of another star from Tennessee, TEN-TEC.

It wasn't by chance that I had the privilege of treading those hallowed halls. TEN-TEC, to the best of my knowledge, was formed by Al Khan, K4FW, whom I first worked in 1985. But it was not until much, much later that someone else told me of the K4FW/TEN-TEC connection. With a visit to the Smoky Mountains National Park area in mind, I wrote to Al. He replied, saying he'd make arrangements for me to see the factory. This I did in late September, 1992.

The outside of the factory and its surroundings are easy on the eye, especially the tri-band beam out front. Rick Long, KE5XY, from Customer Services, met me and I was soon seeing things, just as impressive, inside. TEN-TEC, Rick explained, was started in 1969 and has for some time diversified its operations beyond the construction of quality amateur radios and peripherals.

Nowadays, TEN-TEC is largely self-sufficient, making its own cabinets and chassis and much of its own plastic injections. The sheet metal shop punches the holes and bends the sheet metal which can then be cleaned, painted and silk screened. In fact, a large TEN-TEC sideline is the manufacture of equipment enclosures. MFJ and companies like those making line-surge protectors and so on keep TEN-TEC busy and the machines running. TEN-TEC continues, nevertheless, to welcome enquiries from individuals for generic enclosures.

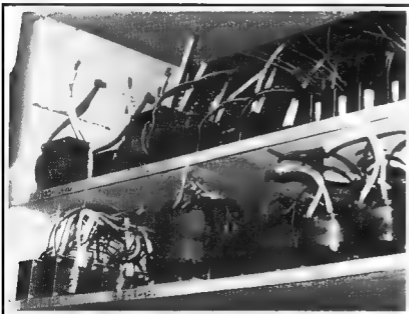
Using this expertise to the full they now direct around 60% of those resources into outside contracts with companies like General Motors, Yale Lock and Dial Light. They work in both aluminium and steel. The computer controlled milling machine provides the masters for front panel extrusions on amplifiers and the larger radios.

As we moved around the factory I saw examples of TEN-TEC's plastic/nylon injections — exquisite miniature coil forms in their hundreds still attached to the mould trees.

Instruction manuals are made on-site, too. Text, schematics and layouts are compiled on a computer CAD system. Plates are then made for an off-set press.

We moved on to the transformer bulk storage area. I was impressed with TEN-TEC's attention to its transformers, especially those for amplifiers like the Centurion. I suspect a degree of "overkill" is built-in. The transformer for the Titan 1.5 kW amplifier, for example, weighs 41 lbs. I took care to bend my knees when lifting it! Furthermore, should a customer need a replacement transformer, they can save \$200 off the cost of a new one by utilising TEN-TEC's exchange scheme.

In the assembly area components are hand-inserted into the various boards. Some boards are grouped in fives and split later. All boards are then given a bottom layer of wax to retain the components whilst the leads are being clipped, and are then wave soldered. TEN-TEC say they can maintain a high standard without the cost of expensive automated equipment. Penny, one of the



The TEN-TEC factory transformer storage area.

charming young ladies on the production line (and far more approachable than a robot!) was able to tell us about the boards she was assembling for a new Jones filter. Incidentally, this patented filter is an eight-pole device using crystals and affords variable bandwidth between 500 Hz and 25,000 Hz, thus avoiding fixed options such as 2,400, 1,800, 500 and 250 Hz.

At the end of the production line rigs are removed for testing on a shaker table to detect any loose screws or components and then "burnt-in". This is done by running them at 50%-75% full power into a dummy load and auto-keying them between transmit and receive once every five seconds for between 16 and 24 hours.

The Model 238 antenna tuner is beautifully engineered. Forty or so of them, virgin and in concert, is a joy truly to be beheld! Not only does TEN-TEC make its own roller inductors, it makes its own high voltage tuning capacitors as well and the good news is that component parts from the ATUs are available for purchase.

I asked Rick how many different amateur radios TEN-TEC currently produced. He said the Argonaut II (the QRP rig), the Delta II, the Paragon and the Omni 6 were the four transceivers (and now, of course, there's the Scout, reviewed in the March 1994 issue, Ed). In the power department there was the Hercules II solid state, 12 V, no tune, auto band-switching amplifier, the Centurion and the Titan.

The 100 W Delta II meets the requirements of a modern transceiver with features including dual VFOs, 48 memories, GC receiver, FM and noise blander

The latest radio, the OMNI 6, is ham-band only, with a top-of-the-line receiver. This rig has built-in digital signal processing with auto notch for SSB. This means that "tuner-uppers" and broadcast station carriers — up to 50 heterodynes in all — can be made to "disappear" at the push of a button! Direct band and frequency entry is nice! There is a keyer and CW variable off-set for sidetone and receive, programmable between 400 and 990 Hertz. There's also a digital



**The TEN-TEC ATU production line.**

low pass filter and built-in tailored high end cut off between 600 and 1400 Hertz. If that isn't enough, optional "voice-link" provides audible frequency read-out. Dual VFOs are provided and an RS 232 interface port with full compatibility with control and logging programs like "CT" and "Log Master".

*It's a fiercely competitive world market, making amateur radios.*

The big "plus" with TEN-TEC equipment has to be the regard for servicing — there's room to "move around" if you have the need to get inside a radio and I've heard many unsolicited testimonials to TEN-TEC's help should a problem occur

Now nearing the end of a fascinating tour, we entered the conference room where the Paragon, the Hercules II, the Model 220 solid state power supply and the automatic tuner were combined into a fully integrated station in a rack presentation. Although it was disconnected from the beam outside and ready for transportation to the Boxville, Massachusetts, Hamfest,

Rick was still able to demonstrate how one module "followed" the other without manual bandswitching as soon as the band or frequency on the Paragon was changed. It was obvious what a superb contest station the combination made

Back on the road I reflected on what Rick had said about the capacitors in the TEN-TEC amps. He had explained that when the WARC bands came in it would have needed an enlarging of the wide-spaced capacitors and a matching extension of the enclosures to bring the units onto the additional frequencies. Instead, TEN-TEC "replaced" air in the dielectric in the capacitors with teflon, which lowered the frequency just as effectively!

It's a fiercely competitive world market, making amateur radios. TEN-TEC's continued success appears to stem from innovation, far-sightedness, team work and a good measure of national pride.

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## ■ Technical

# Variable Capacitors Made From Trimmers

*Drew Diamond VK3XU\* has much useful information about adapting air-spaced trimmers to use (for example) in VFOs.*

Goons' fans will recognise the phrase — "you can't get the wood you know". Well, for the amateur radio constructor it's — "you can't get suitable variable capacitors". Commercial electronics manufacturers have largely moved to varactor diodes for low power tuning duties, and so the demand for capacitors has declined dramatically. However, for many amateur applications, a variable capacitor is still the best, or simplest part for the job. Some desperados have even been reduced to using those pathetic little transistor radio "tuners" with their horrible, lossy, drifty, plastic dielectric.

On parts expeditions to hamfests and disposals shops we generally seem to be able to find pretty good capacitors of the trimmer variety, made by old well known companies such as Hammarlund, Polar, Jackson or Eddystone. But they have no

proper 1/4" shaft, just a screw-driver slot in a dinky little ferrule, not quite suitable for that VFO or receiver project in hand.

The samples shown in photo 1 have (maximum) values between 8 pF and 100 pF, with an air dielectric and ceramic insulation. Most have a round ferrule of about 13/64" diameter and one, the 8 pF unit, has a hexagonal ferrule of about 1/4" across the flats. Soldering an adaptor shaft on is a possibility. However, it is difficult to align ferrule and shaft with sufficient accuracy for the result to be satisfactorily in-line, and mechanical strength may be poor.

Shown in photo 2 is a suggested approach for the hex capacitors; a short length of 1/4" inside diameter fuel hose is attached with spring clips (normally supplied with hose from auto parts shops), and a length of ordinary metal rod (for example a potentiometer off-cut) is fixed into the



Photo 2 Fuel hose adaptor.

other end. Over time the rubber will mould onto the metal parts and achieve an even more effective grip. A small right angled bracket to mount the capacitor, and a front panel bearing bush (perhaps from an old potentiometer) will also be required.

To adapt for round ferrules which are less than 1/4", obtain a length of 1/4" or 5/16" brass rod. Face off each end square. You will need a drill-press or, better still, a lathe. I know that's easy to say. If you do not have access to these tools, one of the members of your radio club, or a mate in the engineering trade may be able to assist. Adjust a vernier or spring caliper to the exact diameter of the ferrule, then find a drill in your collection which is one or a few thousandths of an inch under (just a tiny crack of light visible when the drill shank is held between the jaws of the caliper). If you have a set of Imperial and metric, then it's odds-on that you will have one for the job.

If using a drill press, hold the work in a machine vice or vee-block, and clamp it onto the drill table (sharp new drills will bite into brass rather viciously—slightly dull drills are better for brass work). Centre-drill your adaptor shaft. Double-ended "stubby" drills start the hole more truly than ordinary ones, so use these if available (not hard to buy, they are made for pop-riveting jobs). In at least three stages, starting with a small drill, sneak up on the final drill as previously determined. Drill to a depth equal to the ferrule length, perhaps a few thousandths of an inch less.

Test the capacitor on the adaptor. It should feel like it will go on, but only if some pressure is applied. Too tight

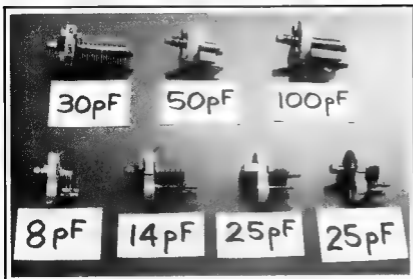
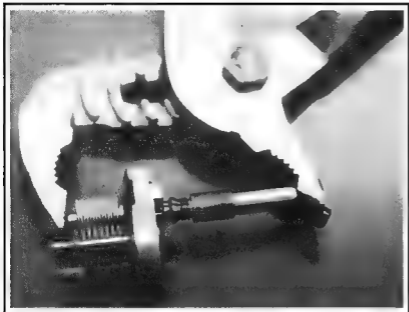


Photo 1 Typical trimmer capacitors.

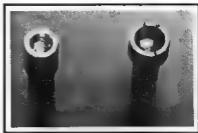


**Photo 3 Press fit adaptor.**

a fit may be eased if necessary by inserting a single junior hacksaw cut across the diameter of the hole. Using multigrips or, better still, a vice, press the adaptor onto the ferrule for a good "friction" fit (see photo 3).

The adaptor on the left in photo 4 is a press fit, as described, made from 5/16" rod. The right hand adaptor was made similarly, but from 3/8" brass for a capacitor whose ferrule is 1/4" (also applicable to 1/4"

AF hex units) Note the single junior hack-saw cut across the larger diameter to allow the adaptor to be pressed onto the capacitor. A threaded hole and grub screw in the side of the adaptor would also serve. However, the press fit is to be preferred, as the resulting job will generally remain more truly in-line.



**Photo 4 Brass adaptors.**

Finally, clean any grime and particles from and between the plates using (say) methylated spirits and a small paint brush, paying close attention to the wiper contact. If necessary lubricate the bearing with a tiny drop of WD-40 (TM) or similar.

"Narr Meian" Gatters Road, Wonga Park VIC 3115

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## WIA News

### Electromagnetic Compatibility Networks

The federal government has moved to establish a nationwide education and training program on electromagnetic compatibility (EMC) standards to help Australian manufacturers and suppliers of electronics equipment meet the government's new EMC standards which will come into force on 1 January 1996.

All electronic equipment manufactured or assembled in Australia, as well as imported equipment, will be required to meet the new EMC standards. It will not be retrospective, however. Goods produced before that date will not need to comply. The Australian Electrical and Electronics Manufacturers Association earlier last year

expressed the concern that there may be some dumping of overseas-made non-complying equipment leading up to that date.

Central to the government's education and training program on EMC will be the establishment of EMC Regional Networks, managed around the country by local co-ordinators. The scheme is to be co-ordinated on a national basis by the Australian Electronics Development Centre (AEDC), based in Melbourne.

The AEDC is a company dedicated to providing specialised training for the Australian electronics and telecommunications industry. It is sponsored by a variety of communications, computer and electronics companies, along with several government departments.

In November, the AEDC called

for proposals from interested parties wishing to become co-ordinators in the scheme and is presently working on establishing the EMC Regional Networks, the objectives being to provide access to the knowledge of EMC experts and EMC programs, a forum for government and industry dealings over EMC issues and a structure for network members to work on specific EMC issues.

According to the AEDC, over 18 months the EMC Regional Networks will help both industry in general and individual companies develop and implement strategies for compliance with national and international technical standards for EMC.

The WIA has made contact with the AEDC to see where the Institute and the hobby might benefit from some involvement.

# Amateur Radio Annual Index 1994

What a tremendous amount of absorbing reading was provided in *Amateur Radio* magazine during 1994, much of it the accounts of WIA members' experiments, construction projects and experiences, and all to do with this most fascinating of all hobbies, amateur radio.

If you see an item in this index which you want to read, and you cannot locate, or

do not have, that particular copy of *Amateur Radio*, back issues of the magazine are available from the Federal Office to current WIA members at \$4.00 each, which includes postage in Australia.

If a back issue is no longer in stock, photocopies of articles are available to members at \$2.50 each (plus \$2.00 for each

additional issue in which the article appears)

And remember The WIA is always on the lookout for technical and general interest articles from members. Have you submitted your contribution lately? For further details on how to write an article about your latest construction project, or amateur radio experience, for your magazine, please refer to the August 1992 issue of *Amateur Radio* (page 18), or contact the editors at the Federal Office of the WIA.

| CATEGORY                            | TITLE   | AUTHOR                       | ISSUE | PAGE |
|-------------------------------------|---|------------------------------|-------|------|
| <b>Administration</b>               |   |                              |       |      |
|                                     | Boost to SMA Liaison  | WIA News                     | Dec   | 69   |
|                                     | Calling All Divisions (Freecall)                            | WIA News                     | Jan   | 07   |
|                                     | Changes at Federal  | WIA News                     | Oct   | 13   |
|                                     | February Federal Council Meeting                            | WIA News                     | Apr   | 46   |
|                                     | Federal 1993 Annual Reports                                 |                              | Apr   | 22   |
|                                     | IARU Region 3 Ninth Regional Conference                     | Kevin Olds VK1OK             | Nov   | 04   |
|                                     | Members Transferring Divisions                              | WIA News                     | Jul   | 16   |
|                                     | New Federal Secretary                                       | WIA News                     | Dec   | 77   |
|                                     | Packet Radio Users and the Law                              | WIA News                     | Dec   | 06   |
|                                     | Reciprocal Licensing Update                                 | WIA News                     | Sep   | 45   |
|                                     | Singapore Conference  | WIA News                     | Oct   | 22   |
|                                     | SMA Inquiry   | WIA News                     | Mar   | 21   |
|                                     | SMA Inquiry (Submission)                                    | WIA News                     | Apr   | 51   |
|                                     | SMA's New Policy on Handling Interference from Transmitters | SMA                          | Nov   | 15   |
|                                     | Stolen Equipment Register                                   |                              | Feb   | 24   |
|                                     | WIA 58th Annual Federal Convention                          | Bill Rice VK3ABP             | Jun   | 09   |
|                                     | WIA Accredited Examiners (list)                             |                              | Feb   | 16   |
|                                     | WIA Federal Budget  | WIA News                     | Dec   | 81   |
|                                     | WIA Videotape Library                                       |                              | Feb   | 27   |
|                                     | World Radio Conferences Planned                             | WIA News                     | Feb   | 23   |
| <b>Antennas, Towers, Lines, Etc</b> |   |                              |       |      |
|                                     | 50 MHz Coaxial Stub TVI Filter                              | Technical Abstracts          | Sep   | 18   |
|                                     | A Simple SWR Bridge   | Godfrey Williams VK5BGW      | Apr   | 14   |
|                                     | A Special Multiband antenna                                 | Random Radiators             | Aug   | 16   |
|                                     | A Transportable Tiltover Tower                              | D Wescombe-Down VK4CMY/VK5HP | Dec   | 08   |
|                                     | An 80 metre Beam  | Random Radiators             | Feb   | 14   |
|                                     | Another 80 Metre Antenna                                    | Random Radiators             | Aug   | 15   |
|                                     | Antennas and Techniques for Low-Band DXing (Book Review)    | Evan Jarman VK3ANI           | Sep   | 20   |
|                                     | Beam Antennas with Bent Elements — Part 1                   | John Sproule VK2AGT          | Aug   | 08   |
|                                     | Beam Antennas with Bent Elements — Part 2                   | John Sproule VK2AGT          | Sep   | 04   |
|                                     | Bush Pole Mast (1993 JOTA)                                  | Noel Lynch VK4BNL            | Oct   | 16   |
|                                     | Choke Balun   | Technical Correspondence     | Aug   | 47   |
|                                     | "Choke" or "Current" Baluns                                 | Technical Correspondence     | Jun   | 48   |
|                                     | Coaxial Cable Wall Mounting                                 | Technical Abstracts          | Oct   | 17   |
|                                     | Experimental Antenna for 160 Metres                         | Dave Thompson VK1DT          | Jul   | 19   |
|                                     | Feedback, Single-Coil Z Match                               | Lloyd Butler VK5BR           | Oct   | 11   |
|                                     | Feeding Vertical Antennas                                   | Technical Correspondence     | Oct   | 46   |
|                                     | Five-band VS1AA/Window                                      | Random Radiators             | Apr   | 16   |
|                                     | Getting a Multiband HF Vertical to Go! (Part 2)             | D Wescombe-Down VK4CMY/VK5HP | Jan   | 08   |
|                                     | Getting a Multiband HF Vertical to Go! (Part 3)             | D Wescombe-Down VK4CMY/VK5HP | Jun   | 12   |
|                                     | Helical Aerials   | Technical Correspondence     | Nov   | 46   |
|                                     | L Matching Network Design                                   | Technical Correspondence     | Nov   | 46   |
|                                     | Low Radiators and High Ground Planes                        | William A McLeod VK3MI       | Nov   | 10   |
|                                     | Simple HF Fox Hunt Equipment                                | Technical Abstracts          | Dec   | 14   |
|                                     | The "L" Network Aerial System Coupler                       | Lindsay Lawless VK3ANJ       | Feb   | 59   |
|                                     | The ARRL Antenna Book (Review)                              | Evan Jarman VK3ANI           | Dec   | 69   |
|                                     | The Automatcher   | Random Radiators             | Jun   | 24   |
|                                     | Tower Standard  | WIA News                     | Aug   | 16   |
|                                     | Triband Dipole  | Technical Abstracts          | May   | 15   |
|                                     | Tuned Feeders and Multiband Antennas                        | J H Gazard VK5JG             | Apr   | 08   |
|                                     | Tuned Feeders and Multiband Antennas — Another Viewpoint    | Technical Correspondence     | May   | 44   |

| CATEGORY | TITLE  | AUTHOR                       | ISSUE | PAGE |
|----------|--|------------------------------|-------|------|
|          | Tuning the TH3-JR Antenna                                    | Alex Stuart VK2ALX           | Oct   | 23   |
|          | <b>Awards</b>  |                              |       |      |
|          | 1993 Amateur Radio Awards                                    |                              | Feb   | 56   |
|          | 1994 Wilkinson Award   | WIA News                     | Apr   | 07   |
|          | 50-54 MHz DX Standings                                       | VHF/UHF - An Expanding World | Feb   | 54   |
|          | British Postcodes  | Awards                       | Oct   | 31   |
|          | Canadaward   |                              | Jan   | 33   |
|          | Islands on the Air (IOTA)                                    |                              | Sep   | 33   |
|          | SMIRK  | Awards                       | Oct   | 30   |
|          | The JARL Awards Program                                      |                              | Jun   | 31   |
|          | The Solitary Islands Award                                   |                              | Nov   | 31   |
|          | VK DXCC Listings   |                              | Aug   | 24   |
|          | WIA DXCC Listing   |                              | Feb   | 39   |
|          | <b>Book Reviews</b>  |                              |       |      |
|          | Antennas and Techniques for Low-Band DXing                   | Evan Jarman VK3ANI           | Sep   | 20   |
|          | ARRL Radio Buyers Sourcebooks                                | Ron Fisher VK3OM             | Jul   | 21   |
|          | DXpeditioning Basics   | Stephen Pall VK2PS           | Aug   | 26   |
|          | NOSintro Evan  | Jarman VK3ANI                | Jul   | 20   |
|          | Technical Topics Scrapbook                                   | Gil Sones VK3AUI             | Oct   | 31   |
|          | The ARRL Antenna Book  | Evan Jarman VK3ANI           | Dec   | 69   |
|          | The Radio Amateur's Guide to EMC (RSGB)                      | Gil Sones VK3AUI             | Nov   | 23   |
|          | <b>Computers and Programs</b>                                |                              |       |      |
|          | An Australian Log Program (Product Review)                   | Evan Jarman VK3ANI           | Apr   | 13   |
|          | NOSintro (Book Review)                                       | Evan Jarman VK3ANI           | Jul   | 20   |
|          | <b>Contests</b>  |                              |       |      |
|          | 17th West Australian Annual 3.5 MHz Contest Results          |                              | Jan   | 36   |
|          | 18th West Australian 80 m Rules                              |                              | Jun   | 35   |
|          | 1992 CQWW DX Contest Results                                 |                              | Feb   | 43   |
|          | 1992 IARU World HF Championship Results                      |                              | Jan   | 37   |
|          | 1993 ARRL DX Contest Results                                 |                              | Jan   | 37   |
|          | 1993 VK/ZL/O DX Contest Rules                                |                              | May   | 24   |
|          | 1994 John Moyle Contest/Field Day Rules                      |                              | Feb   | 43   |
|          | 1994 John Moyle Field Day Results                            |                              | Sep   | 37   |
|          | 1994 Remembrance Day Contest — Rules                         |                              | Jul   | 33   |
|          | 1994 VK/ZL/O DX Contest Rules                                |                              | Aug   | 31   |
|          | 1994 WIA VK Novice Contest Rules                             |                              | May   | 24   |
|          | 9th Australasian 80 m Sprint Rules                           |                              | Jun   | 34   |
|          | 9th IARU HF Championship Rules                               |                              | Jun   | 35   |
|          | Addendum to 1993 VK/ZL/O DX Contest Results                  |                              | Aug   | 31   |
|          | ALARA Contest Rules  |                              | Nov   | 33   |
|          | ANARTS WW DX RTTY Rules                                      |                              | May   | 23   |
|          | Australasian Sprints 1994 Results                            |                              | Nov   | 34   |
|          | Commonwealth Contest 1993 Results                            | WIA News                     | Mar   | 33   |
|          | Commonwealth Contest 1994 Rules                              |                              | Feb   | 42   |
|          | CQ WW DX Contest 1994 Rules                                  |                              | Sep   | 36   |
|          | Jack Fries Memorial Rules                                    |                              | Jun   | 35   |
|          | Merv Stinson Memorial Sprint Rules                           |                              | May   | 23   |
|          | Novice Contest 1994 Results                                  | Contests                     | Oct   | 41   |
|          | NZART 80 m Memorial Rules                                    |                              | Jun   | 34   |
|          | RD Contest Revisited   |                              | Feb   | 41   |
|          | Remembrance Day Contest 1993 — State Winners                 | Contests                     | Oct   | 41   |
|          | Ross Hull Contest 1993-94 Results                            |                              | Apr   | 34   |
|          | Ross Hull Memorial VHF/UHF Contest Rules 1994-5              |                              | Nov   | 34   |
|          | VHF-UHF Field Day 1994 Results                               |                              | Apr   | 35   |
|          | VHF-UHF Field Day Rules 1995                                 |                              | Dec   | 71   |
|          | Waitakere Phone Sprint 80 m Rules                            |                              | Jun   | 36   |
|          | <b>Digital Communications</b>                                |                              |       |      |
|          | A PLL Carrier Detector for the 7910 Packet Modem             | Lou Destefano VK3AQZ         | Dec   | 12   |
|          | Australian Packet Radio BBS Station Listing                  | Grant Willis VK5ZWI          | Sep   | 22   |
|          | Digital SSB  | Technical Abstracts          | Jun   | 19   |
|          | Packet Explained for the Beginner                            | Chris Davis VK1DO            | Dec   | 19   |
|          | Setting Up VK6RWR  | Bob Robinson VK6BA           | Oct   | 22   |
|          | The Packet Doctor  | Packet World                 | Jun   | 44   |
|          | Timewave DSP-9 & 59 Audio Digital Signal Processors (Review) | VK3OM & VK3AFW               | Jan   | 15   |
|          | TNC — Computer — Modem Connections                           | Packet World                 | Nov   | 43   |

| CATEGORY  | TITLE | AUTHOR                        | ISSUE | PAGE |
|---|-------|-------------------------------|-------|------|
| <b>EMC</b>  |       |                               |       |      |
| EMI/EMC Standards   |       | WIA News                      | Oct   | 39   |
| Further Notes on Interference Cancelling                    |       | Lloyd Butler VK5BR            | Jan   | 21   |
| New EMC Standards   |       | Jim Linton VK3PC              | Sep   | 19   |
| Pager Notch Filter  |       | Repeater Link                 | Aug   | 44   |
| RF Radiation and Mankind                                    |       | Hans Ruckert VK2AOU           | Mar   | 36   |
| The Radio Amateur's Guide to EMC (RSGB) (Book Review)       |       | Gil Sones VK3AUI              | Nov   | 23   |
| <b>Equipment Reviews</b>                                    |       |                               |       |      |
| ICOM IC-2340H Dual Band FM Transceiver                      |       | Gil Sones VK3AUI              | Oct   | 14   |
| ICOM IC-2700H VHF/UHF FM Transceiver                        |       | Paul McMahon VK3DIP           | Sep   | 09   |
| ICOM IC-281H and Kenwood TM-251A                            |       | Paul McMahon VK3DIP           | Aug   | 04   |
| ICOM IC-2GXAT   |       | Paul McMahon VK3DIP           | May   | 11   |
| ICOM IC-707 HF All Band Transceiver                         |       | Ron Fisher VK3OM              | Feb   | 08   |
| ICOM IC-736 HF/50 MHz Transceiver                           |       | Ron Fisher VK3OM              | Jul   | 04   |
| ICOM IC-738 All Mode HF Transceiver                         |       | Ron Fisher VK3OM              | Dec   | 04   |
| The TEN-TEC Scout 555 HF Transceiver                        |       | Ron Fisher VK3OM              | Mar   | 12   |
| Timewave DSP-9 & 59 Audio Digital Signal Processors         |       | VK3OM & VK3AFW                | Jan   | 15   |
| Yaesu FT-840 All Mode HF Transceiver                        |       | Ron Fisher VK3OM              | Jun   | 04   |
| <b>History</b>  |       |                               |       |      |
| Australian Amateur Call Signs — History and Confusion       |       | Colin McKinnon VK2DYM         | Sep   | 24   |
| Darwin Revisited WICEN and Cyclone "Tracy" — Christmas 1974 |       | Ted Gabriel VK4YG             | Dec   | 07   |
| <b>Miscellaneous Technical</b>                              |       |                               |       |      |
| 12 GHz Prescaler  |       | Technical Abstracts           | Jun   | 19   |
| A 1 Watt GaAsFET Linear Amplifier for 10 GHz                |       | Technical Abstracts           | Mar   | 16   |
| A Russian Military Aircraft Radio                           |       | Colin McKinnon VK2DYM         | May   | 04   |
| Adjusting and Cleaning Speed Keys (Bugs)                    |       | "Doc" Wescombe-Down VK5HP4CMY | Jul   | 11   |
| Another Tip for Using the Noise Bridge                      |       | Lloyd Butler VK5BR            | Dec   | 21   |
| Audio Filter  |       | Technical Abstracts           | Oct   | 17   |
| Ceramic Resonator VFO                                       |       | Technical Abstracts           | May   | 14   |
| Comparison of Dual Band Handhelds                           |       | Technical Abstracts           | Jul   | 15   |
| CW versus SSB Power   |       | Technical Correspondence      | Jun   | 48   |
| Did They or Did They Not? (Japanese Midget Submarines)      |       | Col Harvey VK1AU              | Jun   | 14   |
| Cox Hunting with a Handheld                                 |       | Technical Abstracts           | Jun   | 22   |
| Iron On PCB Resist  |       | Technical Abstracts           | Feb   | 13   |
| Making Air-Wound Coils for HF                               |       | Drew Diamond VK3XU            | Feb   | 04   |
| Mobile Supply Switch  |       | Technical Abstracts           | Jan   | 19   |
| Mower Generator   |       | Technical Abstracts           | Feb   | 12   |
| Novel VHF Power Amplifier                                   |       | Technical Abstracts           | Nov   | 21   |
| Once Upon a TV Sweep Tube                                   |       | "Doc" Wescombe-Down VK5HP4CMY | Mar   | 10   |
| Overvoltage Protection                                      |       | Technical Abstracts           | Nov   | 20   |
| Overvoltage Protection for Equipment                        |       | Technical Abstracts           | Sep   | 17   |
| Peg Vice for Printed Circuit Boards                         |       | Technical Abstracts           | Dec   | 14   |
| Printed Circuit Breadboard                                  |       | Technical Abstracts           | Apr   | 19   |
| Removing a Surface Mount IC                                 |       | Technical Abstracts           | Feb   | 12   |
| Simple 10 GHz Transmitter                                   |       | Technical Abstracts           | Aug   | 18   |
| Simple Semiconductor Tests                                  |       | Technical Abstracts           | Oct   | 17   |
| Speaker/Headphone Control Box                               |       | Lindsay Collins VK5GZ         | Apr   | 20   |
| TAD Helps Again   |       | Bill Yates VK4YWY             | Mar   | 51   |
| Technical Articles in Radio Rivista                         |       | George Cranby VK3GI           | Jul   | 14   |
| The CRADBIG Charger   |       | Reg Carter VK3CAZ             | Dec   | 09   |
| <b>Operating</b>  |       |                               |       |      |
| 1994 Remembrance Day Contest Opening Address                |       | Richard Butler AM             | Sep   | 12   |
| A Compact Shack   |       | Fred Boorman VK4ZU            | May   | 18   |
| Amateur Radio on a Budget Part 1                            |       | "Doc" Wescombe-Down VK5HP4CMY | May   | 07   |
| Amateur Radio on a Budget Part 2                            |       | "Doc" Wescombe-Down VK5HP4CMY | Jun   | 17   |
| Cellular Phones and Cancer                                  |       | QSP News                      | Aug   | 51   |
| First IARU Region 3 ARDF Championships                      |       | Wally Watkins VK4DO           | Mar   | 18   |
| Forever Courteous   |       | Bob Hawksley VK2GRY           | Dec   | 20   |
| Hobbyfest 93 — A Win for Amateur Radio                      |       | Julie Kentwell VK2XBR         | Apr   | 10   |
| Japanese Encounter  |       | Brian Ward VK2WBJ             | May   | 18   |
| JOTA '93  |       | WIA News                      | Feb   | 06   |
| JOTA — 37th Jamboree-On-The-Air                             |       | Peter Hughes VK6HU            | Sep   | 08   |
| Moonbounce Tests from VE3ONT                                |       | AMSAT Australia               | Oct   | 26   |
| Packet Explained for the Beginner                           |       | Chris Davis VK1DO             | Dec   | 19   |
| QSLing — A Necessary Evil?                                  |       | Neil Penfold VK6NE            | Mar   | 07   |

| CATEGORY                     | TITLE  | AUTHOR                       | ISSUE | PAGE |
|------------------------------|--|------------------------------|-------|------|
|                              | Roof Top Run — January '94                                 | Jack Bramham VK3WWW          | Dec   | 18   |
|                              | Scouting Ingenuity 1993 JOTA                               | Noel Lynch VK4BNL            | Oct   | 16   |
|                              | SEAnet '93 Convention                                      | David Rankin 9V1RH/VK3QV     | Jul   | 13   |
|                              | SEAnet Says "Make it Malacca"                              | Thomas E King VK2ATJ         | Sep   | 13   |
|                              | Setting Up VK6RWR  | Bob Robinson VK6BA           | Oct   | 22   |
|                              | The Chinese Connection                                     | Joe Ellis VK4AGL             | Aug   | 13   |
|                              | The Joy of Kit Building                                    | Alex Edmonds VK3BQN          | May   | 09   |
|                              | VK4JAW and the Balloon Attempt                             | QSP News                     | Aug   | 21   |
|                              | WICEN Standard Operating Procedures                        | Trevor Connell VK8CO         | Jul   | 09   |
|                              | Young Radio Operator Speaks to the World                   | Norm D'Angri VK3LBA          | Feb   | 58   |
| <b>People</b>                |  |                              |       |      |
|                              | Christine Goode Appointed as Spectrum Manager              | QSP News                     | Sep   | 46   |
|                              | Hartmut 9X5HG  | How's DX                     | Aug   | 36   |
|                              | Ivor Stafford VK3XB  | Awards                       | Nov   | 30   |
|                              | Jim Rumble VK6RU   | Awards                       | Nov   | 30   |
|                              | Ken Stevens VK5QW  | Awards                       | Dec   | 28   |
|                              | Mavis Stafford VK3KS                                       | Awards                       | Nov   | 30   |
|                              | Mr Richard Butler AM (Remembrance Day Contest Speech)      |                              | Sep   | 12   |
|                              | Peter Doyle VK2KMK (and others)                            | Truckie's Travels            | Jul   | 17   |
|                              | Profile of VK2GW   | D Reynolds VK2ANW            | Oct   | 24   |
|                              | Young Radio Operator Speaks to the World (Dean VK3LDS)     | Norm D'Angri VK3LBA          | Feb   | 58   |
| <b>Places</b>                |  |                              |       |      |
|                              | Bhutan A5  | How's DX                     | Dec   | 74   |
|                              | Marion Island  | How's DX                     | Oct   | 36   |
|                              | North West Territory                                       | How's DX                     | Jun   | 39   |
|                              | Peter I Island 3Y0PI                                       | How's DX                     | Mar   | 38   |
|                              | Pitcairn Island  | How's DX                     | Jan   | 39   |
|                              | South Georgia Islands                                      | How's DX                     | Nov   | 37   |
|                              | St Peter and St Paul Rocks ZY0                             | How's DX                     | Jul   | 38   |
|                              | The Azores   | QSLs from the WIA Collection | Oct   | 44   |
| <b>Propagation</b>           |  |                              |       |      |
|                              | Aircraft Enhancement                                       | Technical Correspondence     | Jun   | 48   |
|                              | Meteor Scatter   | Technical Abstracts          | Oct   | 19   |
|                              | Moonbounce Tests from VE3ONT                               | AMSAT Australia              | Oct   | 26   |
|                              | More Unbelievable VHF/UHF Propagation?                     | Gordon MacDonald VK2ZAB      | Feb   | 07   |
|                              | Solar Parameters   | How's DX                     | Jun   | 39   |
| <b>Receivers</b>             |  |                              |       |      |
|                              | Empirical Approach to Building an HF Receiver              | Drew Diamond VK3XU           | Oct   | 03   |
|                              | FM 828 Audio Preamp and Mute                               | Repeater Link                | Feb   | 52   |
|                              | FM 828 Receiver IF and Detector                            | Repeater Link                | Jan   | 44   |
|                              | Fox Hunting with a Handheld                                | Technical Abstracts          | Jun   | 22   |
|                              | Mods to the Bandwidth Limiting LF Converter to Include VLF | Lloyd Butler VK5BR           | Mar   | 04   |
|                              | The Bandwidth Limiting LF Converter Simplified             | Lloyd Butler VK5BR           | Jan   | 11   |
| <b>Regulations</b>           |  |                              |       |      |
|                              | 80 m DX Window — Take Care                                 | WIA News                     | Sep   | 13   |
|                              | AX and VI Prefix Callsigns                                 |                              | Jul   | 14   |
|                              | Class Licensing (CB and Handphone)                         | QSP News                     | Oct   | 49   |
| <b>Repeaters and Beacons</b> |  |                              |       |      |
|                              | Amateur Band Beacons (list) VHF/UHF                        |                              | Sep   | 48   |
|                              | FM 828 Audio and Power Supply                              | Repeater Link                | Apr   | 45   |
|                              | FM 828 Audio Preamp and Mute                               | Repeater Link                | Feb   | 52   |
|                              | FM 828 Exciter   | Repeater Link                | Jun   | 47   |
|                              | FM 828 Microphone Amplifier                                | Repeater Link                | Sep   | 46   |
|                              | FM 828 Power Amplifier                                     | Repeater Link                | Oct   | 46   |
|                              | FM 828 Receiver IF and Detector                            | Repeater Link                | Jan   | 44   |
|                              | FM 828 Reference Oscillators                               | Repeater Link                | May   | 44   |
|                              | FM 828 Transmitter VCO                                     | Repeater Link                | Jul   | 31   |
|                              | FM 828 Tune Up   | Repeater Link                | Nov   | 42   |
|                              | Pager Notch Filter   | Repeater Link                | Aug   | 44   |
|                              | Power Supply   | Repeater Link                | Dec   | 86   |
|                              | Setting Up VK6RWR  | Bob Robinson VK6BA           | Oct   | 22   |
| <b>Test Equipment</b>        |  |                              |       |      |
|                              | 12 GHz Prescaler   | Technical Abstracts          | Jun   | 19   |
|                              | A Simple SWR Bridge  | Godfrey Williams VK5BGW      | Apr   | 14   |
|                              | Another Tip for Using the Noise Bridge                     | Lloyd Butler VK5BR           | Dec   | 21   |

| CATEGORY  | TITLE | AUTHOR                         | ISSUE | PAGE |
|---|-------|--------------------------------|-------|------|
| Battery Tester as RF Ammeter                                |       | Technical Abstracts            | Jul   | 15   |
| Cable Length Measuring Circuit                              |       | Technical Abstracts            | Aug   | 18   |
| Inductance Measuring Made Simple                            |       | George Cranby VK3GI            | May   | 17   |
| The Green Dipper  |       | Technical Abstracts            | Jan   | 19   |
| Tone Modulated HF Noise Bridge                              |       | Technical Abstracts            | Sep   | 18   |
| Wide Range Capacitance Bridge                               |       | Technical Abstracts            | Apr   | 18   |
| <b>Transceivers</b>   |       |                                |       |      |
| IC-2340H Dual Band FM Transceiver (review)                  |       | Gil Sones VK3AUI               | Oct   | 14   |
| ICOM IC-2700H VHF/UHF FM Transceiver (review)               |       | Paul McMahon VK3DIP            | Sep   | 09   |
| ICOM IC-281H and Kenwood TM-251A Transceivers (Review)      |       | Paul McMahon VK3DIP            | Aug   | 04   |
| ICOM IC-2GXAT (Review)                                      |       | Paul McMahon VK3DIP            | May   | 11   |
| ICOM IC-707 HF All Band Transceiver (Review)                |       | Ron Fisher VK3OM               | Feb   | 08   |
| ICOM IC-736 HF/50 MHz Transceiver (Review)                  |       | Ron Fisher VK3OM               | Jul   | 04   |
| ICOM IC-738 All Mode HF Transceiver (Review)                |       | Ron Fisher VK3OM               | Dec   | 04   |
| The TEN-TEC Scout 555 HF Transceiver (Review)               |       | Ron Fisher VK3OM               | Mar   | 12   |
| Yaesu FT-840 All Mode HF Transceiver (Review)               |       | Ron Fisher VK3OM               | Jun   | 04   |
| <b>Transmitters</b>   |       |                                |       |      |
| A 1 Watt GaAsFET Linear Amplifier for 10 GHz                |       | Technical Abstracts            | Mar   | 16   |
| FM 828 Exciter  |       | Repeater Link                  | Jun   | 47   |
| FM 828 Microphone Amplifier                                 |       | Repeater Link                  | Sep   | 46   |
| FM 828 Power Amplifier                                      |       | Repeater Link                  | Oct   | 46   |
| FM 828 Reference Oscillators                                |       | Repeater Link                  | May   | 44   |
| FM 828 Transmitter VCO                                      |       | Repeater Link                  | Jul   | 31   |
| Once Upon a TV Sweep Tube                                   |       | "Doc" Wescombe-Down VK4CMY/5HP | Mar   | 10   |
| Simple 10 GHz Transmitter                                   |       | Technical Abstracts            | Aug   | 18   |
| Teeny Weeny Tx  |       | Technical Abstracts            | Jan   | 20   |
| <b>WICEN</b>  |       |                                |       |      |
| Appreciation for WICEN                                      |       | WIA News                       | May   | 06   |
| Darwin Revisited WICEN and Cyclone "Tracy" — Christmas 1974 |       | Ted Gabriel VK4YG              | Dec   | 07   |
| Victoria Co-ordinators' Seminar                             |       | Howard Small VK3DLH            | Jan   | 04   |
| WICEN Activated for the Sydney and Central Coast Bush Fires |       | Dr Tony Farrow VK2TJF          | Apr   | 04   |
| WICEN Standing Operating Procedures                         |       | Trevor Connell VK8CO           | Jul   | 09   |
| WICEN Training Conference — From Two Points of View         |       | John Howard VK2AMH             | Sep   | 14   |

III

## What's New

Bob Tait VK3UI\* introduces new products of interest to radio amateurs

### New from Cushcraft Corporation

#### ASL-2010 Skylog Log Periodic

The new Cushcraft ASL2010 Skylog Log periodic antenna released in September 1994, is the answer for hams who would like to have a single antenna to cover all bands from 10 to 20 metres. This new antenna eliminates the need for two antennas to cover 20, 15 and 10 metres plus the WARC frequencies. No more switches — it uses a single feedline with an inbuilt balun; no traps to increase the wind loading (10.1 sq ft).

The ASL-2010 will operate continuously at 1 kW. The gain of the antenna is 6.4 dBd. It has eight elements, the longest being 11.58 metres, with a boom length of 5.48 metres. The entire assembly is made from 6063-T832 aluminium for maximum strength combined with

lightness. The mounting hardware and element clamps are made from stainless steel.

The ASL-2010 represents a cost effective five band, high gain antenna. It is easy to install on a tower and will provide long and trouble free service.

For further enquiries contact your local Cushcraft Distributor

\*C/o PO Box 2175, Caulfield Junction VIC 3161

III

**Have you advised  
the WIA Federal  
Office of your new  
Callsign? Use the  
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# DICK SMITH ELECTRONICS

## Don't go mobile without a Yaesu Mobile Transceiver!

Whether you're going bush or operating around town, a quality mobile transceiver from Yaesu delivers the best performance.

### FT-2400H Rugged 2m Transceiver

The ultimate in dependability and reliability! The FT-2400H is built using commercial grade mechanical and electronic construction techniques and meets the tough USA MIL-STD-810C shock and vibration requirements, so you know you're getting the highest quality. A one-piece die-cast chassis/heatsink allows three-step output of up to 50 watts without forced air cooling. Plus, fibreglass circuit boards and chip components provide professional-grade reliability. It has a large backlit LCD screen, backlit knobs and 31 tuneable memories (which can store frequency and a four-character name of your choice). A customised microprocessor also provides Auto Repeater Shift to suit Australian conditions. Two-stage track-tuning and a dual FET mixer improve receiver intermod performance. Scanning functions include programmable scan limits, selectable scan resume modes, memory skip, and priority monitoring. Seven selectable channel-steps and CTCSS encode are standard features. Comes complete with MH-26 hand mic., mobile mounting bracket and DC power lead.

Cat D-3630

2 Year Warranty

**\$699**



#### Specifications

##### General

Frequency range: Transmit 144-148 MHz  
Receive 140-174 MHz  
Channel steps: 5, 10, 12.5, 15, 20, 25 & 50 kHz  
Current Consumption: Receive 400mA  
Transmit: 12 Amp (Hi power)  
Dimensions: 160 x 50 x 180mm (w/o knobs)

##### Receiver

Intermediate Freq: 21.4MHz & 455kHz  
Image Rejection: Better than 70dB  
Maximum AF Output: 2.0 watts into 8 ohms @ 10% THD

##### Transmitter

RF Output power: 50/25/5 watts (Hi/Med/Low)



### FT-2200 2m Mobile Transceiver

The new FT-2200 is a compact, fully featured 2m FM transceiver providing selectable power output of 5, 25 and 50 watts, and includes the latest convenience features for more enjoyable mobile or base station operation. Built around a solid diecast chassis, it provides 49 tuneable memories, a large variety of scanning modes, an instant recall CALL channel, 7 user selectable channel steps from 5kHz to 50kHz and is just 140 x 40 x 160mm (not including knobs). Backlighting of the large LCD screen, knobs and major buttons is even automatically controlled to suit ambient light conditions. Also provided is a 38 tone CTCSS encoder, DTMF based paging and selective calling with Auto-Page/Forwarding features, and 10 DTMF auto-dial memories. The LCD screen provides a highly legible bargraph Signal/P.O. meter plus indicators for the various paging and repeater modes. An optional internal DVS-3 digital recording/playback board can also be controlled from the front panel, giving even greater messaging flexibility. Supplied with an MH-26DB hand microphone, mobile mounting bracket and DC power lead.

Cat D-3635



2 Year Warranty

**\$699**

# See Us For The Latest in High Quality

## Yaesu FT-840 HF Transceiver

Blending the high-performance digital frequency-synthesis techniques of the FT-890 with the operating convenience of the FT-747GX which it replaces, the all new FT-840 HF mobile transceiver sets the new standard for high performance in affordable transceivers. Covering all HF amateur bands from 160m-10m with 100w P.E.P. output, and with continuous receiver coverage from 100kHz to 30MHz, the FT-840 provides SSB/CW/AM operation (FM optional), 100 memory channels, a large back-lit LCD screen, two independent VFOs per band, an effective noise blander and an uncluttered front panel, all in a compact case size of just 238 x 93 x 243mm (WHD). Unlike some competing models, small size doesn't mean small facilities. The FT-840 provides easily-accessible features such as: Variable mic gain and RF power controls, SSB Speech processor for greater audio punch, and IF Shift plus CW Reverse to fight interference. Dual Direct Digital Synthesizers ensure clean transmitter output and fast Tx/Rx switching, while the low noise receiver front-end uses an active double-balanced mixer and selectable attenuator for improved strong signal handling. The FT-840 weighs just 4.5kg and uses a thermally-switched cooling fan, surface-mount components and a metal case for cool, reliable operation. An extensive range of accessory lines are available, including the FC-10 external automatic antenna tuner, so you can customise the FT-840 to suit your operating requirements.

Cat D-3275



**\$1695**  
**2 Year Warranty**

## FT-11R Micro Deluxe 2m Handheld

One of the world's smallest 2m FM handhelds with a full-size keypad, the Yaesu FT-11R has been reduced in size, but not in features. Designed to fit comfortably in your hand, it's just 57 x 102 x 25.5mm (WHD) including the FNB-31 NiCad pack and weighs only 280 grams. The result of the latest in miniaturisation, microprocessor control and FET technology, the FT-11R provides a large back-lit LCD screen with full frequency readout, 150 memories (75 in alpha-numeric mode), full function keypad with easy SET mode, and up/down thumb control Volume and Squelch settings. A new high efficiency FET RF amplifier provides 1.5W output standard from the compact 4.8V battery pack, and up to 5W output from 9.6V (using an optional battery pack or PA-10 mobile adaptor). A range of battery life extenders, including Auto Battery Saver, Tx Save, and Auto Power Off (with ultra low 20uA consumption) are included. Australian version Auto Repeater Shift, DMTF based selective calling and paging, extended 110-180MHz receiver coverage (including the AM aircraft band), and a variety of scanning modes are also provided. Other new features include naming of memory channels, DTMF Auto-dial memories, and DTMF Message Paging with up to 6 alpha-numeric characters. A large range of accessory lines are also available for easier customisation of your transceiver. The FT-11R comes with an FNB-31 800mA/H NiCad, belt clip, approved AC charger, CA-9 charge adaptor and antenna.

Cat D-3640



**2 Year Warranty**

**\$599**



# ility Transceivers And Accessories!

## High Performance VHF/UHF Base Station Antennas

Our range of top-name Brainer base station antennas offer outstanding quality and exceptional value. They are stacked collinear types providing high gain, wide bandwidth and a low radiation angle for extended range. The fibreglass reinforced polyester (FRP) outer tubing random and gasket seals provide excellent all-weather operation, and they are supplied with compact ground-plane radials for a clean radiation pattern. Stainless-steel mounting hardware ensures a

long trouble-free life. They also feature comprehensive instruction sheets to make installation and set-up easier. Both come with a 1 year warranty

### 2m/70cm GST-1

Frequency: 144-148MHz, 430-450MHz  
Gain: 6dB on 2m, 8dB on 70cm  
Max. Power: 200W  
Length: 2.5m  
Type: 2 x 5/8 wave (2m)  
4 x 5/8 wave (70cm)

Connector: SO-239 socket

**\$199**

Cat D-4830

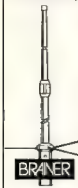
### 2m/70cm GST-3

Frequency: 144-148MHz, 430-440MHz  
Gain: 7.9dB on 2m, 11.7dB on 70cm  
Max. Power: 200W  
Length: 4.4m  
Type: 3 x 5/8 wave (2m)  
7 x 5/8 wave (70cm)

Connector: SO-239 socket

**\$299**

Cat D-4835



## 2m RF Power Amplifier

Boost your 2m hand-held's performance with this compact amplifier. Works with 0.3 to 5W input and provides up to 30W RF output, plus has an inbuilt GaAsFet receive pre-amp providing 12dB gain. A large heatsink and metal casing allow for extended transmission at full output, and a mobile mounting bracket is supplied for vehicle use. Requires 13.8V DC at 5A max. Size 100 x 36 x 175mm (W x H x D)



Cat D 2510

**digitor \$149.95**

## Rugged HF 5-Band Trap Vertical Antenna

The rugged 5BTV is a 5 band HF trap vertical which continues the Hustler tradition of quality and performance. It incorporates Hustler's exclusive trap design (25mm solid fibreglass formers, high tolerance trap covers and low loss windings) for accurate trap resonance with 1 kW (PEP) power handling. Wideband coverage is provided on the 10, 15, 20 and 40m bands (SWR typically 1.15:1 at resonance, < 2:1 SWR at band edges) with 80kHz bandwidth typical on 80m at less than 2:1 SWR. An optional 30m resonator kit can also be installed without affecting operation of the other bands. High strength aluminum and a 4mm (wall thickness) extra heavy-duty base section guarantee optimum mechanical stability. At just 7.65m, the 5BTV can be ground mounted (with or without radials, although radials are recommended), or it can be mounted in an elevated position with a radial system. Unlike some other antenna designs, the 5BTV can be fed with any length of 50-ohm coax cable.

Cat D-4920

**HUSTLER**

**\$299**

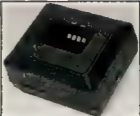
## Master Charger 1 Fast Desktop Charger

At last, an intelligent, fast desktop charger that not only suits most current Yaesu hand-helds but also many previous models.

Made in USA, the

MasterCharger 1 operates from 13.5V DC and uses switch mode technology plus a Priviga battery charge monitor I.C. (with -ΔV full charge detection) to correctly fast-charge NiCad batteries between 6V and 13.2V, then switch to a trickle charge. Suitable for the FT-23/73, FT-411/411e, FT-470, FT-26, FT-415/815 and FT-530, its charging cradle can easily be replaced, allowing for the insertion of a new cradle to suit earlier Yaesu transceivers (eg FT-209R) or different brands/model hand-helds. The MasterCharger 1 requires 12-15V DC at 1.3A, and is supplied with a fused cigarette lighter cable for vehicle use.

Cat D 3850



**\$169.95**

Now available - charging cradles to suit various Kenwood, Icom, and Alinco hand-helds.

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MAJOR AMATEUR STOCKIST STORES SHOWN IN RED

# ALARA

Sally Grattidge VK4SHE\*, ALARA Publicity Officer

## ALARA For Men

Dear OM, does the YL in your life think amateur radio is about as exciting as unblocking the sink (though that, too, can yield unexpected thrills)? Does she only pick up *Amateur Radio* to dust under it, turns pale at the thought of studying electronics and the dreaded "Code", and finds she has something extremely important to do every time you suggest she joins you in the shack?

If you answered yes to all the above, and sometimes wish your hobby could be more of a shared pastime, then make her a nice cup of coffee and give her this article to read. OK, you can go now.

Dear YL, what follows is a bit of basic information about ALARA, for you, and any other YL who has not given ALARA a thought for quite a while.

## Australian Ladies' Amateur Radio Association

ALARA was formed in 1975 by a small group of Australian ladies interested in

amateur radio. Membership has now grown to over 200, with many Australian members sponsoring overseas YLs into ALARA on a reciprocal basis. The term YL stands for "Young Lady", regardless of age.

To enable Australian members to get together on air for a chat, an ALARA net is held each Monday night on 80 metres. This often helps newcomers to our hobby to overcome "mike shyness" by operating in a friendly atmosphere. If you do not yet hold a licence, you can still participate in this net if you are in the shack of a licensed operator who supervises all transmissions.

Many ALARA members also join in world-wide YL nets and in local state nets, thus making many friends. Monthly luncheons are held in some states, to which all are welcome, particularly visitors from other states and overseas.

ALARA holds a contest on the second Saturday in November. This is a friendly type of contest, with men also

participating. A special trophy is awarded to the Australian Novice YL with the highest score in radio telegraphy, and certificates go to winners of other sections.

A Newsletter is issued quarterly containing news of members' activities, as well as official ALARA information. We also have a monthly column in *Amateur Radio*, the official magazine of the Wireless Institute of Australia with which ALARA is affiliated.

ALARA has an attractive Award based on contacts with other members and is quite easy to earn. Details of the Award and of the various badges, charms, stickers, spoons, etc with our distinctive emblem can be found in the Newsletter.

## DX News from Maria VK5BMT

The YL 222 DX Net has been a bit quiet lately because of poor propagation, but Net Controller Dave ZL1AMN is there every Monday, and hopefully conditions will improve soon.

Carol H44BC said her farewells last Monday. She is moving back to the States where she will make upgrading her license a priority so that she can get back on the net again before too long.

Dawn ZL2AGX is progressing well and awaiting the erection of her beam so she can come back on the air.

## Oz News

Bev VK6DE's husband Brian VK6AI is also recovering from heart surgery, so Bev's Friday net has been a bit quiet lately.

Bron VK3DYF enjoyed the annual lunch of her local radio club SPARC, celebrated a granddaughter's 18th birthday, went to two dinners and a morning tea — all in the same week!

Dorothy VK2DDB is spending a few days in Canberra, showing her two younger boys the sights and attending the Mid South Coast RC meeting, also hoping to meet Marion VK2BNG.

\*C/O PO Woodstock QLD 4816

## YL NETS — Conditions Permitting

### OFFICIAL ALARA NET

Mondays on 3.580 MHz +/- at 1030 UTC (during daylight saving — 1000 UTC)

### ALARA MONTHLY GENERAL MEETING

#### YL ACTIVITY DAY

as above 4th Monday  
6th of each month listen on the hour/call "CQ YL"  
Frequencies — 14.288, 21.188, 28.588 MHz  
Mondays on 14.222 MHz at 0600 UTC (call in from 0545 UTC)  
Thursdays on 14.243 MHz +/- at 1700 UTC (Net Control — Christine GM4YMM)  
Fridays on 14.148 MHz at 0500 UTC  
Fridays on 3.575 MHz +/- at 0930 UTC  
Mondays on 3.585 +/- MHz at 1200 UTC (Net Control — Poppy VK6YF)  
Fridays on 21.188 MHz at 0400 UTC

### YL "222" DX NET

### EUROPEAN YL-DX NET

### VE/VK/ZL NET

### VK4 YL NET

### VK6 ALARA/YL NET

### BEV VK6DE

## ALARA Membership

As from September 1994, subscriptions have increased, but you can still enjoy a year of fun and friendship for about the same price as lunch in town.

Annual subscription, due 1 Jan, to be sent to the Treasurer C/- PO Box 758, Dalby, Qld 4405.

- |         |  |
|---------|--|
| \$12.00 | Australian member                              |
| \$ 8 00 | Australian Pensioner — pension number required |
| \$ 6 00 | Australian full time student, 18 years/under   |
| \$10 00 | DX Self paid                                   |
| \$10 00 | Sponsored — Australian address                 |
| \$ 8 50 | Sponsored — DX — Economy Airmail               |
| \$ 5 00 | Sponsored — DX — Surface Mail                  |
| \$12 00 | Non-member's subscription to Newsletter        |

You do not have to be a member to join in the nets, and it is a great way for newcomers to radio to make friends and get used to talking on air. There is very little technical jargon on YL nets, and

plenty of chatting about kids and gardens, hobbies and holidays, so why not listen a few times and see if you would like to join in, you will be very welcome.

**When you buy something from one of our advertisers, tell them you read about it in the WIA Amateur Radio Magazine.**

# AMSAT Australia

Bill Magnusson VK3JT\*

## Sunday Night Net

Please note that for the remainder of the summer daylight saving period the Sunday night net will be conducted at 0900 UTC with early check-ins at approx 0845 UTC. The frequency for this period will be 7068 MHz +/- QRM.

## Home Brewer's Corner

A couple of mentions this month. Ron VK4BRG registered his interest in the home brew segment. He is particularly interested in computer programs for designing printed circuit boards and the subsequent production of PCBs from these designs. Another Ron, VK6TF, has been in touch to say that he is making progress on the digital satellites. He is moving from the ubiquitous turnstile antennas towards a fully controllable az/el Yagi system. Ron brings out some interesting points. In his own words,

### National co-ordinator

Graham Ratcliff VK5AGR

Packet: VK5AGR@VK5WI

### AMSAT Australia net:

Control station VK5AGR

Bulletin normally commences at 1000 UTC, or 0900 UTC on Sunday evening depending on daylight saving and propagation. Check-ins commence 15 minutes prior to the bulletin.

Frequencies (again depending on propagation conditions):

Primary 7064 MHz. (usually during summer).

Secondary 3685 MHz. (usually during winter).

Frequencies +/- for QRM.

### AMSAT Australia newsletter and software service

The newsletter is published monthly by Graham VK5AGR. Subscription is \$30 for Australia, \$35 for New Zealand and \$40 for other countries by AIR MAIL. It is payable to AMSAT Australia addressed as follows:

AMSAT Australia

GPO Box 2141

Adelaide SA 5001

"Since I last wrote to you I have made quite a bit of progress towards operating reliably through the digital satellites. I have finished building a home-brew 17 element crossed Yagi for 435 MHz. I have started on an 8 element crossed Yagi for 145 MHz, but as a stop-gap measure I'm using a turnstile as the up link antenna. The Yagis sit at either end of an 8 ft cross boom and are fixed at 30 degrees to the horizon but capable of being rotated in a horizontal plane..... the 17 element ariel produces good, strong signals and appears to be working very well, at least for receiving..... I only have to turn the aeriels about two or three times during an entire pass".

In the early days of OSCARs 6, 7 and 8, az/el systems were a luxury and computerised az/el was only a dream. At that time many people were using beams tilted up at about 30 degrees as a practical and inexpensive way of coping with the LEO satellites. The method seems to have slipped from the culture in recent years but, as Ron suggests, it works and is certainly worth considering if you don't want to go to the expense of a complete az/el system. Thanks to both Rons for their contributions this month.

## Six Monthly Amateur Radio Satellite Frequency and Mode Update

Here is the latest update on the currently operational OSCARs. As this is a rather volatile area, I would appreciate any feedback about errors or omissions.

| Satellite  | Uplink (MHz)    | Downlink (MHz)  |
|--|-----------------|-----------------|
| <b>OSCAR 10 (AO-10)</b>  |                 |                 |
| General Beacon (Carrier only)  |                 | 145.810         |
| Engineering Beacon (irregular and garbled)   |                 | 145.987         |
| Mode B (SSB, CW-Inverting)   | 435 030-435 180 | 145 825-145.975 |
| Note: AO-10 is out of control but provides good communications via mode "B" when the batteries are fully charged. It looks like AO-10 is drifting back to a more favourable attitude. Occasionally signals have been as good as in the heady days when it was under control. |                 |                 |
| <b>OSCAR 11 UoSAT-2 (UO-11)</b>  |                 |                 |
| Beacon (1200 AFSK FM) telemetry only   |                 | 145.826         |
| Beacon (1200 AFSK FM) telemetry only   |                 | 435.025         |
| Beacon (1200 AFSK FM) carrier only   |                 | 2401.500        |

Note: UO-11's 2401.5 MHz beacon is off at the time of writing but may be turned on again soon. When it is on there does not appear to be any modulation but the signal is very strong and is great for checking out "S" mode gear.

|                                 |               |                    |
|---------------------------------|---------------|--------------------|
| <b>Radio Sputnik 10 (RS-10)</b> |               |                    |
| Mode A (SSB, CW-Invert ng)      | 145 86-145.90 | 29 360-29 400      |
| Beacon/Robot (CW)               |               | 29 357             |
| Beacon/Robot (CW)               |               | 29 403             |
| Robot Mode A (CW)               | 145 82        | 29 357 or 29 403   |
| Mode K (SSB, CW-Invert ng)      | 21 160-21 200 | 29 360-29 400      |
| Beacon/Robot (CW)               |               | 29 357             |
| Beacon/Robot (CW)               |               | 29 403             |
| Robot Mode K (CW)               | 21 120        | 29 357 or 29 403   |
| Mode T (SSB, CW-Inverting)      | 21 160-21 200 | 145.86-145.90      |
| Beacon/Robot (CW)               |               | 145.857            |
| Beacon/Robot (CW)               |               | 145.903            |
| Robot Mode T (CW)               | 21 120        | 145.857 or 145 903 |

|                                 |               |               |
|---------------------------------|---------------|---------------|
| <b>Radio Sputnik 11 (RS-11)</b> |               |               |
| Mode A (SSB, CW-Inverting)      | 145 91-145 95 | 29 410-29 450 |
| Beacon/Robot (CW)               |               | 29 407        |



|                                 |               |                    |
|---------------------------------|---------------|--------------------|
| <b>Satellite</b>                |               |                    |
| Beacon/Robot (CW)               |               | 29 453             |
| Robot Mode A (CW)               | 145 83        | 29 407 or 29 453   |
| Mode K (SSB, CW-Inverting)      | 21 210-21 250 | 29 410-29 450      |
| Beacon/Robot (CW)               |               | 29 407             |
| Beacon/Robot (CW)               |               | 29 453             |
| Robot Mode K (CW)               | 21 130        | 29 407 or 29 453   |
| Mode T (SSB, CW-Inverting)      | 21 210-21 250 | 145 91-145 95      |
| Beacon/Robot (CW)               |               | 145.907            |
| Beacon/Robot (CW)               |               | 145.953            |
| Robot Mode T (CW)               | 21 130        | 145.907 or 145.953 |
| <b>Radio Sputnik 12 (RS-12)</b> |               |                    |
| Mode A (SSB, CW-Inverting)      | 145.91-145.95 | 29 410-29 450      |
| Beacon/Robot (CW)               |               | 29 408             |
| Beacon/Robot (CW)               |               | 29 454             |
| Robot Mode A (CW)               | 145.831/ 840  | 29 408 or 29 454   |
| Mode K (SSB, CW-Inverting)      | 21 210-21 250 | 29 410-29 450      |
| Beacon/Robot (CW)               |               | 29 408             |
| Beacon/Robot (CW)               |               | 29 454             |
| Robot Mode K (CW)               | 21 129        | 29 408 or 29 454   |
| Mode T (SSB, CW-Inverting)      | 21 210-21 250 | 145 910-145 950    |
| Beacon/Robot (CW)               |               | 145 912            |
| Beacon/Robot (CW)               |               | 145 959            |
| Robot Mode T (CW)               | 21 129        | 145 912 or 145 959 |
| <b>Radio Sputnik 13 (RS-13)</b> |               |                    |
| Mode A (SSB, CW-Inverting)      | 145 96-146 00 | 29 460-29 500      |
| Beacon/Robot (CW)               |               | 29 458             |
| Beacon/Robot (CW)               |               | 29 504             |
| Robot Mode A (CW)               | 145.84        | 29 458 or 29 504   |
| Mode K (SSB, CW-Inverting)      | 21 260-21 300 | 29 460-29 500      |
| Beacon/Robot (CW)               |               | 29 458             |
| Beacon/Robot (CW)               |               | 29 504             |
| Robot Mode K (CW)               | 21 138        | 29 458 or 29 504   |
| Mode T (SSB, CW-Inverting)      | 21 260-21 300 | 145 960-146 000    |
| Beacon/Robot (CW)               |               | 145 862            |
| Beacon/Robot (CW)               |               | 145 908            |
| Robot Mode T (CW)               | 21.138        | 145 862 or 145 908 |

| Satellite   | Uplink (MHz)    | Downlink (MHz)        |
|---|-----------------|-----------------------|
| <b>AMSAT-OSCAR-13 (AO-13)</b>   |                 |                       |
| General Beacon (400 BPSK, CW, 50 Baud RTTY)   | 145.812         |                       |
| Engineering Beacon (PSK, CW, RTTY)  | 145.985         |                       |
| Mode B (SSB CW-Inverting)   | 435.420-435.570 | 145.825-145.975       |
| Mode S (SSB, CW, FM)  | 435.601-435.639 | 2400.711-2400.747     |
| Beacon (PSK RTTY) seldom turned on  |                 | 2400.325              |
| Beacon (PSK) On 1st 2 MA counts of "S" time   |                 | 2400.664              |
| Note: Modes "L" and "J" are no longer operational on AO-13 due to the failure of the 70 cm transmitter  |                 |                       |
| <b>UoSAT-OSCAR-14 (UO-14)</b> (UO-14 has been taken out of amateur service)   |                 |                       |
| <b>AMSAT-OSCAR-16 (AO-16) Callsign = PACSAT</b>   |                 |                       |
| Mode J (1200 BPSK)  |                 |                       |
| BBS, FM-SSB)  | 145.90/92/94/96 | 437.025 or 437.050    |
| Mode S (1200 BPSK)  |                 |                       |
| BBS FM-SSB)   |                 | 2401.10 or 2401.1428  |
| <b>AMSAT-OSCAR-17 (DO-17) (Dove)</b>  |                 |                       |
| Beacon 1 (1200 bps AFSK Digital Voice, FM)  | 145.82516       |                       |
| Beacon 2 (1200 bps AFSK Digital Voice, FM)  | 145.82438       |                       |
| Beacon 3 (1200 BPSK, Digital Voice, SSB)  | 2401.2205       |                       |
| Note: Dove's 2401.2205 MHz beacon has been switched on again. Signals are very strong. It is useful for checking out "S" mode gear.   |                 |                       |
| <b>AMSAT-OSCAR-18 (WO-18) (Webersat)</b>  |                 |                       |
| Mode J (1200 BPSK, RC, SSB)   | 144.30-144.50   | 437.075 or 437.10     |
| ATV (TV, AM)  | 1265.000        |                       |
| <b>AMSAT-OSCAR-19 (LO-19) Callsign = LUSAT</b>  |                 |                       |
| (1200 PSK, FM-SSB)  | 145.84/86/88/90 | 437.15355 or 437.1258 |
| <b>FUJI-OSCAR-20 (JAS-1b) (FO-20) Callsign = 8J1JBS</b>   |                 |                       |
| Beacon JA (CW, Analog)  | 435.795         |                       |
| Mode JA (SSB CW)  | 145.90-146.00   | 435.80-435.90         |
| Beacon JD (CW)  | 435.910         |                       |
| Mode JD (1200 BPSK, FM-SSB)   | 145.85/87/89/91 | 435.910               |
| <b>OSCAR-21 (AO-21), Radio Sputnik 14 (RS-14)</b>   |                 |                       |
| Note: AO-21 is currently shut down. At the time of writing it is not known if it has failed or has been turned off permanently. The parent Russian satellite, NFORMATOR-1 has been de-commissioned.   |                 |                       |
| <b>UoSAT-OSCAR-22 (UO-22) Callsign = UOSAT5</b>   |                 |                       |
| Mode JD (9600 Baud FSK, FM)   | 145.90/975      | 435.120               |
| <b>KITSAT-OSCAR-23 (KO-23) Callsign = HL01</b>  |                 |                       |
| Mode JD (9600 Baud FSK, FM)   | 145.85/90       | 435.175               |
| <b>KITSAT-OSCAR-25 (KO-25) Callsign = HL02</b>  |                 |                       |
| Mode JD (9600 Baud FSK, FM)   | 145.980         | 436.500               |
| <b>ITAMSAT-OSCAR-26 (IO-26) Callsign = ITMSAT</b>   |                 |                       |
| Mode JD 1200 baud PSK   | 145.875         | 435.867               |
|   | 145.900         | 435.822               |
|   | 145.925         |                       |
|   | 145.950         |                       |
| <b>AMPAD-OSCAR-27 (AO-27)</b>   |                 |                       |
|   | 145.850         | 436.800               |
| Note: AO-27 operated as a commercial satellite (EVEsat) during the week and is switched to amateur service at weekends. It is currently configured as an FM voice repeater and is switched on only over the northern hemisphere. It may soon be configured for digital mode. When that happens however, it will not respond to normal Pacsat software. It will require a TNC modification and normal communications software. |                 |                       |
| <b>POSAT-OSCAR-28 (PO-28) Callsign = POSAT1</b>   |                 |                       |
| Mode JD 1200 baud FSK   | 145.925         | 435.250               |
|   | 145.975         | 435.275               |
| Note: PO-28 is another part time amateur radio satellite. Its scheduling is uncertain, as is the on-going availability to the amateur community.  |                 |                       |

## Thought for the month

Wherever you go, there you are! (I think I need a holiday).  
 359 Williamstown Rd, Yarraville VIC 3013 Packet: VK3JT@VK3BBS

ar

Count on us!

# "VK3LZ calling!"

All the latest news from your friends at Icom.

Repeater soon for Melbourne.

It is hoped that early in the New Year our donated 23 cm repeater will be up and running in Melbourne. This will be music to the ears of enthusiasts and those considering entering the field. I might start dabbling myself!

Older accessories to be cleared.

Today's changes in technology are occurring at such a fast rate.

This means that accessories for some early models must be cleared. Contact your dealer to enquire if any accessories you require are part of this clearance, or we can tell you where to find them.

On the move!

During 1994 I enjoyed seeing many of you in Perth, Mt. Gambier, Gosford and the Victorian Conventions. In 1995 I hope to spread my wings even further. I look forward to seeing you then.

## "...73"

Call me at Icom on  
 free call (008) 338 915  
 ph: (03) 529 7582  
 fax: (03) 529 8485

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NRD-535F  
S PCA



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AR3000A \$1950  
AR-8000 PCA



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### AEA DATA CONTROLLERS represent the most exciting value in amateur radio today.

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Tired of waiting for packet data? Wish for an easy solution? Now there is one the PK-96, a cost-effective, high-speed, single-mode data controller.

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## SSB Electronic



**DBA-270** Dual band low noise GaAs FET preamp with automatic RX/TX switch and 20db gain noise fig 1.3 db/2m 1.5db/70cm \$ 479

### SP-2000/7000.

Hi quality preamplifiers for 2m & 70cm band. Hi gain, low noise & coax switch. Typ gain 20dB noise fig 0.8 dB 2m 0.9dB 70cm \$489



**UEK-2000 SAT** Special converter for "OSKAR" satellite reception HF 2400 MHz IF 144MHz. Built in LNA noise fig 0.6db \$ 846



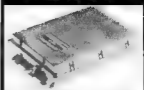
**SP-13** Low noise GaAs-Fet preamp for SSB 2300-2400 MHz band. High gain 120dB and a noise fig of 1.2db \$ 769



**SP-23** A superior GaAs-Fet preamp for 1250-1300 MHz band. High gain 120dB and a noise fig of 0.9db \$ 739

## KENWOOD & ICOM AT BEST PRICES

### The SG-230 Smarttuner HERE AT LAST



Whether you are a HAM, LAND MOBILE, MARINE or AIR BAND operator, you need a efficient antenna coupler. The best on the market today is definitely the SG-230 made by ICOM, Inc. The SG-230 is a fully automatic antenna tuner with looking feature, where a computer system continuously monitors all antenna parameters and instantly selects the right values from more than half a million combinations in its matching circuit to make sure everything is perfectly tuned. With 500 position non-volatile memory built in, and a memory management program, there is only one word for SG-230: HF AUTOMATIC ANTENNA COUPLER - RELIABILITY! PRICE \$795

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- PC/SSB Antenna System
- PC/SSB Drive Amplifier
- PC/SSB Noise
- Software based Station
- HF/SSB Communication System

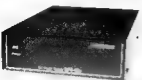
CONTACT US FOR MORE INFO!

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SPACE AGE TECHNOLOGY AT AFFORDABLE PRICE!

The EMTRON new switching mode power supply will comfortably run any of your HAM RADIO TRANSCEIVERS at 13.8Vdc and 20Amp peak!

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### C5718-twin band & C1218 mono band transceivers.

Everything you need is in the speaker mic, it's PACKET READY up to 9600 bauds and 9600 is 9600 watts, too! Call for specifications!

## NEW JRC JST-145/245

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Complete with BUILD-IN SWITCHING POWER SUPPLY, AUTOMATIC ANT TUNER, POWER MOSFET 3EPPs. 5x575M unit features that only a six page colour brochure can describe.



## TET-EMTRON ANTENNA SYSTEMS

SAVE Free Current 1.1 beam worth \$59 + c/m's now with every TET-EMTRON beam antenna!

**\$59**

THREE BAND BEAMS FOR 14-21-28 MHz BANDS

|                                |       |
|--------------------------------|-------|
| TE-13 rotatable dipole         | \$199 |
| TE-23 2-element beam           | \$414 |
| TE-23M 2-ele mini-beam         | \$440 |
| TE-33 3-element beam           | \$575 |
| TE-43 4-element beam           | \$750 |
| HB-35C 5-element trapless beam | \$770 |

DUE TO SHARP INCREASE IN WORLD WIDE DEMAND, PRICES WILL NOT BE ABLE TO HOLD OUR PRICES MUCH LONGER. BUY YOUR ANTENNA NOW OR IT WILL BE TOO LATE!

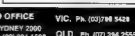


### FOUR BAND BEAMS FOR 7-14-21-28 MHz BANDS

|   |       |
|---|-------|
| TE-14 rotatable dipole                        | \$275 |
| TE-34 3-ele beam on 14-21-28MHz 1-ele on 7MHz | \$695 |
| TE-44 4-ele beam on 14-21-28MHz 1-ele on 7MHz | \$870 |

### SIX BAND BEAMS FOR 10-14-18-21-25-28 MHz BANDS

|  |       |
|--|-------|
| TE-26 dual rotatable dipole                          | \$380 |
| TE-46 3-ele beam on 14-21-28MHz 1-ele on 10-18-25MHz | \$750 |
| TE-56 3-ele beam on 14-21-28MHz 2-ele on 10-18-25MHz | \$950 |



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## Awards

John Kelleher VK3DP — Federal Awards Manager\*

In response to my suggestion that I would publish information on local awards, Rod Dunham VK4MFH has forwarded the following

### Worked Rockhampton Award

Eligibility: 3 contacts with a Rockhampton callsign (VK4WIR the Club callsign counts as 2 contacts)

Fee: \$5.00 for printing and mailing costs.

Post your log extract to The Awards Manager, CQ Branch, WIAQ, PO Box 496, Rockhampton Qld 4700.

Maybe this is a beginning for active Club Stations which supply awards.

### Kuwait National and Liberation Day Award

On 25 and 26 February every year, the State of Kuwait celebrates its National and

Liberation Day. To mark this auspicious event, the Kuwait Amateur Radio Society is delighted to announce an international award.

The contest is open to both licensed radio amateurs and shortwave listeners, according to the following rules and regulations:

1. Contacts may be conducted on any band or mode.
2. The contest will start at 0000 UTC on 25 February every year, and will end at 2400 UTC on 26 February. The time could be extended to the end of February.
3. There will be two callsigns in use, 9K2RA/NLD and 9K2.../NLD (9K2RA is the Club Callsign).
4. To qualify for the award, the participant is required to secure at least 3 points by making:

- (a) Two contacts with KARS station (9K2RA/NLD) and one contact with any other Kuwait amateur station the call letters of which are added to, for example, 9K2DR/NLD, or
- (b) Three contacts with three different Kuwait amateur stations.

5. The participant must submit a certified copy of their log-book entries, along with a fee of five IRCs or \$US3.00.
6. There is no deadline for submitting applications, which should be addressed to The Award Manager, Kuwait Amateur Radio Society, PO Box 5240 Safat, 13053, Kuwait.

### Vanuatu Award

The Vanuatu Amateur Radio Society (VARS) issues the Vanuatu Award for working at least six YJ8 stations who are members of VARS. Contacts made from 30 July 1980, Vanuatu Independence Day, are acceptable.

Contacts may be made by any mode. Endorsements for single band, single mode, or additional stations worked are available. Two contacts with any one YJ8 station will be accepted, provided that contacts are made on different days bands or modes.

Send a certified log extract and 10 IRCs or \$US2.00 to Awards Manager, VARS, PO Box 665, Port Vila, Vanuatu.

### The Diploma RAEM

This award, in honour of E T Krenkel, polar explorer and first president of the RSF, is issued for confirmed contacts with Russian amateur stations operating beyond the north and south Polar Circles.

To obtain the diploma, 68 points are required. Each contact with RAEM counts 15 points. Each contact with stations in the Arctic and Antarctic counts 10 points. Each contact with stations in the Arctic Islands counts five points, and each QSO with stations beyond the North Polar Circle count two points. Points are doubled for contacts made by stations located in the Oceania region.

Valid QSOs must have been made since 24 December 1972, on any HF band, CW only.

Applications should be sent to Radio Sport Federation of Russia, PO Box 88 Moscow, along with a fee of one rouble (approx \$US3.00).

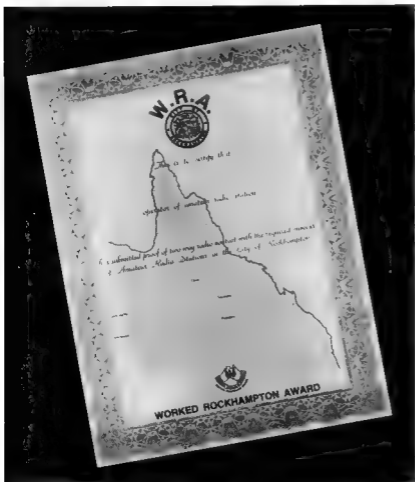
### Suriname Award

The Vereniging van Radio Amateurs in Suriname (VRAS) issues one operating award for making two-way contacts with three PZ stations.

Certified log data and \$US5.00, for defrayment of postage and printing of the certificate, should be sent to VRAS, PO Box 1153 Paramaribo, Suriname.

\*PO Box 2175 Caulfield Junction 3161

ar



# Contests

Peter Nesbit VK3APN\* Federal Contest Coordinator

## Contest Calendar Jan — Mar 95

|               |                            |          |
|---------------|----------------------------|----------|
| Dec 26-Jan 28 | Ross Hull VHF/UHF Contest  | (Nov 94) |
| Jan 1         | ARRL Straight Key "Night"  | (Dec 94) |
| Jan 7/8       | ARRL RTTY Roundup          | (Dec 94) |
| Jan 14/15     | VHF/UHF Field Day          | (Dec 94) |
| Jan 14/15     | HA DX CW Contest           | (Dec 94) |
| Jan 27/29     | CQ WW 160 m DX Contest     | (Dec 94) |
| Jan 28/29     | UBA Belgium SSB DX Contest |          |
| Feb 11/12     | PACC CW/SSB DX Contest     |          |
| Feb 11/12     | Spanish RTTY Contest       |          |
| Feb 18/19     | ARRL DX CW Contest         |          |
| Feb 24/26     | CQ 160 Metre SSB Contest   |          |
| Feb 25/26     | RSGB 7 MHz CW Contest      |          |
| Feb 25/26     | UBA Belgium CW DX Contest  |          |
| Mar 4/5       | ARRL DX SSB Contest        |          |
| Mar 11/12     | BERU CW Contest            |          |
| Mar 18/19     | WIA John Moyle Field Day   |          |
| Mar 18/19     | Bermuda Contest            |          |
| Mar 18/19     | BARTG RTTY Contest         |          |
| Mar 25/26     | CQ WPX SSB Contest         |          |

Looking through the results of overseas DX contests, one cannot help but be struck by high scores achieved by many overseas entrants. In the CQ-WW for instance, 40 m scores approaching a million are not uncommon, and on 80 m the best scores nudge half a million. How do they do it?

A clue is contained in a recent American magazine, about a US contester who set off for the Caribbean one particular contest, armed with a good rig and assorted antennas. Not surprisingly, he worked heaps, despite going barefoot and using fixed wire beams. His article concluded by saying that one didn't need high power or huge antennas to win a contest; the more cynical amongst us might say that an exotic callsign didn't hurt either!

Seriously though, the real message stems from the fact that, in the months leading up to the event, the contester performed research into the best sort of rig to take, and which antennas would be the most practical and versatile. He assembled some reliable ancillaries (headphones, computer etc), spent money on fares and accommodation, and arranged the necessary licence. During the event he operated according to a predetermined plan, and afterwards analysed his experiences and wrote them up in an article. Broadly speaking, he demonstrated a considerable degree of initiative, planning, self-organisation, and determination, and followed it up with a review of his efforts. The key words are *planning and commitment*.

How many times have we entered contests in a half baked manner? Perhaps

we stayed up too late the night beforehand, or maybe we got embroiled in household chores which caused us to miss the first hour, and become exhausted into the bargain. Perhaps we got distracted by something on TV, or through some ultimately futile attempt not to be nagged about contests, went through the motions of eating with the family before rushing back into the shack. And, who hasn't operated with a rig or antenna which wasn't up to scratch? We probably knew about it well in advance, but how many of us put off the necessary repairs until it was too late? What about those rush jobs where we were still soldering wires together an hour and a half into the contest?

I know there are some who seem to have it all together, but for the rest of us it's too easy to put in a 90% or 75% effort, instead of 110%. The net effect is encapsulated in the results: good score, but could have been better. So, we make all the right promises for the next year's event, then promptly forget them, and the cycle repeats itself a year later!

As I've said before, contesting is such a tough and time consuming activity, that we owe it to ourselves to put in our very best efforts. We need to emulate the US contester mentioned above, ie plan, prepare, commit, review, and improve. So, finish that linear, get those antennas up even higher, check out that contest logging program, and hunt down that local RFI. The effort will be well worth it!

Thanks to VK2BQS, VK6NKK, PA3BFM, CQ, QST, and Radio Communications. Until next month, good contesting!

73, Peter VK3APN

## UBA SSB/CW HF Contest

SSB: 1300z Sat to 1300z Sun, Jan 28-29  
CW: 1300z Sat to 1300z Sun, Feb 25-26

This contest runs on the last full weekend of Jan and Feb each year (SSB & CW respectively). Any station may work any other worldwide. Categories are: single operator (single & all band); multioperator single transmitter, QRP, max 10 W O/P, SWL. Frequencies CW 3500-3560, 7000-7035, 14000-14060, 21000-21060, 28000-28060; SSB 3600-3650, 3700-3800, 7040-7100, 14125-14300, 21175-21350, 28400-28700.

Exchange RS(T) plus serial number. Belgian stations will add their province code. Score 10 points for contacts with Belgian stations, 3 points with other European stations, and 1 point with others. The multiplier is the total of Belgian provinces, Belgian prefixes, and European countries. Total score is QSO points times multiplier. Send log, summary sheet, declaration etc. within 30 days to: UBA HF Contest, Oude Gendarmenstraat 82, B-2220 Heist Op Den Berg, Belgium. Logs on disk in K1EA or ASCII format also welcome.

## PACC CW/SSB DX Contest

1200z Sat to 1200z Sun, Feb 11-12

The PACC is another popular European contest, with phone and CW held on the same weekend. The object is to work as many Dutch stations as possible on 160 to 10 m, excluding the "WARC" bands. Categories are single and multi-operator; SWL. Only CW contacts are eligible on 160 m. Stations may be worked only once per band, regardless of mode.

Exchange RS(T) plus serial number; Dutch stations will RS(T) plus a 2 letter province code. Possible codes are: DR FF GD GR LB NB NH OV UT FL ZH ZL. Score 1 point per Dutch QSO. Final score equals the total QSO points times the total Dutch provinces worked from each band (max 72). Mail logs by 31 March to Frank E van Dijk PA3BFM, Middellaan 24, NL-3721 PH Biltthoven, The Netherlands. Certificates will be awarded to the top scoring stations in each category and country, including second and third places where justified.

## Spanish RTTY Contest

1600z Sat to 1600z Sun, 11/12 Feb

The object is to contact as many stations worldwide as possible, on RTTY, 80 to 10 m. Categories are single operator (single/multiband); multioperator single transmitter; SWL.

Exchange signal report and CQ zone. Spanish stations will send signal report and province. On 10/20 m score one point per QSO with stations inside your WAC

continent, and two points with stations outside your WAC continent. On 40 and 80 m, the QSO points are tripled. QSOs between stations in the same country can be claimed for multiplier credit, but not QSO points. The multiplier is the sum of the DXCC countries and Spanish provinces (max 52) per band. The final score is the total QSO points times the multiplier.

Send log, summary and declaration by 8 April to: EA RTTY Contest, c/o EA1MV Antonio Alcolado, PO Box 240, 09400 Aranda de Duero (Burgos), Spain

## ARRL DX Contest

CW 0000z Sat to 2400z Sun, Feb 18-19 SSB, 0000z Sat to 2400z Sun, Mar 4-5

There is always plenty of activity in this popular contest. The CW section runs on the third full weekend in February each year, and the phone section on the first full weekend in March. The object is to work as many WVE amateurs as possible on 1.8-30 MHz. Categories are single operator (single band, all band, all band QRP max 5 W Q/P, and all band assisted); Multioperator (single Tx, two Txs, and

unlimited). In the single and 2 Tx categories, once a transmitter has begun operation on a band it must remain on that band for at least 10 minutes. Listening time counts as operating time.

Exchange RS(T) and a 3 digit number indicating approx output power. WVE stations will send RS(T) and state/province. Score 3 points per WVE QSO. The multiplier is the sum of US states and District of Columbia (DC) (except KH6/KL7), NB (VE1), NS (VE1), PEI (VE1 or VY2), PQ (VE2), ON (VE3), MB (VE4), SK (VE5), AB (VE6), BC (VE7), NWT (VE8), YUK (VY1), NF (VO1), and LAB (VO2) worked to a maximum of 63 per band. The final score equals the total QSO points times the multiplier.

Entries with more than 500 QSOs must include crosscheck (dupe) sheets. Logs on DOS disk are welcome in lieu of a paper log, providing a paper summary sheet showing usual info is included. Multioperator entries must list all operators. Entries must be postmarked by 5 April 1995 or they will be classed as check logs (no exceptions)! Mark the envelope CW or Phone, and send the log

to: "ARRL Contest Branch, 225 Main Street, Newington, CT 06111, USA". Certificates will be awarded to the top scoring stations in each country and category, and plaques to the top worldwide and continental stations.

## RSGB 7 MHz CW Contest

1500z Sat to 0900z Sun, Feb 25-26 1995

The object of this contest is to contact as many British Isles stations as possible on 40 m CW. Exchange RST plus serial number starting at 001, UK stations will add their county code (see this column Sept 93 for list). Oceania stations score 30 points per QSO, and the final score is the total QSO points times the number of UK counties worked. Include a summary sheet showing all standard details, plus a checklist if more than 80 QSOs are made. Send logs to arrive by 17 April 1995 to "RSGB HF Contests Committee c/o S. V. Knowles G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, England". Airmail is recommended, as late logs may be treated as check logs. Certificates will be awarded to the leading entrants in each overseas section.

## Results of 1994 7 MHz RSGB Contest

(Call/QSOs/Mult/Score)

VK6VZ 32 19 16910  
VK3APN 21 14 8820

## Results of 1994 West Australian SSB & CW Contests

Presented by Cliff, VK6NK

### CW:

|   |        |      |
|---|--------|------|
| 1 | VK6BN  | 1890 |
| 2 | VK6AFW | 1248 |
| 3 | VK6HQ  | 1104 |
| 4 | VK6AR  | 864  |
| 5 | VK5UE  | 370  |
| 6 | VK3XB  | 288  |
| 7 | VK3APN | 240  |

### SSB:

|    |        |       |
|----|--------|-------|
| 1  | VK6BN  | 12972 |
| 2  | VK6HQ  | 9728  |
| 3  | VK6AFW | 5760  |
| 4  | VK6RG  | 4440  |
| 5  | VK6AR  | 3136  |
| 6  | VK5BKM | 2376  |
| 7  | VK6CSW | 1220  |
| 8  | ZL1BVK | 840   |
| 9  | VK5PMC | 570   |
| 10 | VK5UE  | 108   |
| 11 | VK4OD  | 96    |

## Results of 1994 ANARTS World Wide RTTY Contest

Presented by Jim, VK2BQS

Overall, the decline in the sunspot cycle is reflected in entrant's scores, very few of whom improved over last year. Those who did appeared to have worked longer hours (and maybe harder, hi).

## WIA News

### Cable Pay TV and Interference

Cable-delivered Pay TV poses a possible threat to amateur radio operations, the WIA Federal Council learned from a report written by Federal Technical Advisory Committee Coordinator, John Martin VK3KWA, which was considered at the Council's October quarterly meeting.

Frequencies to be used by the proposed cable system range from low VHF through to UHF, with a "return" channel in the HF spectrum (Pay TV is interactive, or two-way). The greatest potential for two-way interference between Pay TV installations and amateur radio, apparently, involves the household feed points.

The cables themselves are understood to pose less of a threat, with today's standards. Horror stories from the United States and Canada abound, where "cheap" cable installations caused particular problems for amateurs.

Legislation excludes the

Spectrum Management Agency from administering Pay TV matters; that's the province of Austel, apparently. Standards Australia standards will likely cover the appropriate equipment and installation environment, along with electromagnetic compatibility.

However, cable-delivered Pay TV was thrown into some doubt in November following an announcement by the Communications Minister, Michael Lee, that the government would not allow Optus Vision to hold a monopoly on its proposed cable system.

Optus Vision planned to sling cables between electricity poles in the street, with a target of reaching one million homes by 1996 and more than three million by 1998. Optus has scuttled the plan following Minister Lee's announcement.

The WIA is monitoring the situation, particularly with regard to Austel's involvement and developments with Standards Australia.

There probably won't be any significant improvements until the 1997 contest, although maybe the "dead low" might be shorter this cycle.

It was good to see many old friends participating despite the difficulties, and in particular I draw the attention of all to the presence of Syd, VK2SG. Despite the poor health which he has suffered for quite some time now, he managed to operate the keys and submit an entry. We all appreciated your efforts Syd, well done.

Many entrants commented about the lack of VKs in the contest (although 18 were logged this year, 50% more than last year). Also, many promised to be with us again next year. Examples follow:

"A lot of QRN and somebody stole 10 m, only 2 QSOs" (SV2BFN); "Trx fine contest, condx not so good but see you next year" (JR5JJAQ); "Maybe next year the bands will be better" (VE7SAV); "Pleased to work at least one VK, I hope to improve on antennas for next year" (GW4KHQ); "I did not operate for long as I was putting up a tower and beam" (VK6GOM); "cu in ANARTS 1995" (SP6CYV); "Poor condx here again. Heard no JAs, only one African, and even USA was scarce!" (WBFFQ).

There were many requests for scoring sheets and points tables, which will not be answered individually, as copies automatically go to all participants. However, as well as keeping these for your own use next year, we would be pleased if you could initiate copies to go to your local club.

Thanks for your efforts, and 73 to all from the President and Committee of ANARTS. The following results show in order: Call, Score, QSOs, Multiplier, Countr es, VK Bonus, The World Plaque winners are shown by an asterisk (\*).

#### Single Operator:

|         |            |     |    |   |      |
|---------|------------|-----|----|---|------|
| VK2KM   | *3,765,325 | 212 | 95 | 5 | n/a  |
| SV2BFN  | 1,987,530  | 225 | 97 | 6 | 1000 |
| JR5JJAQ | 1,802,920  | 171 | 80 | 6 | 1000 |
| UA4LCQ  | 1,009,704  | 188 | 87 | 6 | 1200 |
| VE7SAV  | 734,888    | 173 | 56 | 6 | 1400 |
| IV3FSG  | 420,500    | 107 | 50 | 6 | 200  |
| GW4KHQ  | 313,790    | 110 | 59 | 6 | 500  |
| W2KHQ   | 285,302    | 87  | 47 | 6 | 200  |
| JH7QXJ  | 276,620    | 63  | 41 | 5 | 1100 |
| ZL2JON  | 190,920    | 54  | 30 | 4 | 3600 |
| ZA1JA   | 188,160    | 153 | 49 | 4 | 0    |
| 4X6UO   | 187,840    | 106 | 42 | 5 | 100  |
| ZL1SY   | 158,080    | 56  | 20 | 4 | 400  |
| CP1FF   | 145,040    | 49  | 28 | 5 | 0    |
| OM3ZJW  | 119,000    | 73  | 41 | 4 | 100  |
| YL3KF   | 113,920    | 68  | 44 | 3 | 400  |
| VK2CTD  | 108,368    | 46  | 26 | 4 | n/a  |
| SP3EJ   | 102,050    | 50  | 37 | 5 | 300  |
| VK2BQS  | 97,824     | 39  | 24 | 4 | n/a  |
| DJ2YE   | 68,150     | 49  | 29 | 5 | 100  |
| VK6GOM  | 64,892     | 38  | 24 | 3 | n/a  |

|          |        |    |    |   |      |
|----------|--------|----|----|---|------|
| SP9LKS   | 59,900 | 38 | 30 | 5 | 200  |
| SP6CYV   | 56,520 | 41 | 31 | 5 | 100  |
| W9FFQ    | 52,268 | 53 | 28 | 4 | 300  |
| JM1NKT   | 39,152 | 25 | 22 | 4 | 1400 |
| JA3BSH   | 38,000 | 25 | 21 | 4 | 200  |
| W6/G0AZT | 38,000 | 52 | 21 | 3 | 200  |
| VE6JAV   | 35,260 | 32 | 19 | 5 | 300  |
| VP9MZ    | 27,612 | 38 | 19 | 4 | 100  |
| W2JGR/O  | 21,530 | 40 | 18 | 3 | 200  |
| YU7AE    | 16,500 | 43 | 25 | 3 | 0    |
| DL7VOG   | 10,850 | 33 | 25 | 2 | 0    |
| AB5KD    | 10,620 | 31 | 20 | 3 | 0    |
| VK8BE    | 7,829  | 14 | 9  | 3 | n/a  |
| N2CQ     | 6,720  | 42 | 15 | 2 | 0    |
| VK2SG    | 6,447  | 11 | 7  | 3 | n/a  |
| DF5BX    | 6,240  | 23 | 20 | 2 | 0    |

|          |       |    |    |    |   |
|----------|-------|----|----|----|---|
| YO3FRI   | 2,596 | 17 | 11 | 2  | 0 |
| OH6UP    | 1,818 | 13 | 9  | 2  | 0 |
| N2ALE/6  | 252   | 3  | 3  | 20 | 0 |
| JJ8DEN/1 | 60    | 3  | 3  | 1  | 0 |

Check logs: SM6APB WA0ACI

#### Multiplier:

|        |          |     |    |   |      |
|--------|----------|-----|----|---|------|
| VE3FJB | *441,965 | 168 | 49 | 5 | 1700 |
| LY1BZB | 57,728   | 78  | 41 | 4 | 0    |

#### SWL:

|         |          |     |    |   |     |
|---------|----------|-----|----|---|-----|
| ONL383  | *260,790 | 136 | 59 | 6 | 600 |
| ONL4335 | 118,550  | 68  | 46 | 5 | 100 |
| ONL3997 | 47,244   | 62  | 32 | 4 | 0   |
| DE0GMH  | 8,304    | 34  | 24 | 2 | 0   |

\*C/o PO Box 2175, Caulfield Junction VIC 3161

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## Divisional Notes

### VK2 Notes

Richard Murnane VK2SKY

Since the re-formation of the broadcast team in recent weeks, we've been working to improve the content of the Division's weekly news bulletin. A number of popular features have been reinstated, such as magazine technical highlights, and communications news from the mainstream media. The popular tape segments from Tim Mills VK2ZTM returned, and we are continuing Winston Muscio's series on Australian Radio History (so far we've had only one complaint).

The recurrent legal and defamation news items of the past have mostly been dropped (though the recent High Court decision to nullify the more draconian aspects of our state's defamation laws is most welcome, hopefully, we will once again be able to express our views on air without having to consult our solicitors first).

The Division welcomes submissions and clippings from amateurs and SWLs, as well as further suggestions for improving the content of the Division's weekly broadcast.

Repairs and renovations to the Dural transmitting facility are continuing. Dural Officer, David Horsfall VK2KFU/VK2ZTB has brought the station back to where it was before it was vandalised nearly a year ago. We've even had good signal reports from VK3 stations, who lamented recently that the recent high winds had taken out the antennas at the VK3 Divisional station in Melbourne.

However, we didn't escape completely in VK2. High winds took out power lines at Dural, restricting the evening broadcast of 20 November to what could be done on battery power. Plans are being laid to cope with such outages more effectively

in the future! The same high winds brought a large branch down on the 160 metre dipole, altering its radiation characteristics somewhat.

### Many Hands Make Light Work

If you're short of ideas for New Year's resolutions, how about resolving to lend some of your spare time to your Division? There are many jobs that need to be done to get the Division back on its feet, administrative, technical and organisational. If you can "donate" even just a few hours of your time, we can find something useful you can do with it.

How do you know if you have time to spare? One way, according to American motivational speaker Anthony Robbins, is to look at your television set; if it's switched on, then you have spare time going to waste. Think about it.

### The Season of Good Will

By the time you read this, Christmas will have come and gone. Those of us from the northern hemisphere still find it strange not to be huddled around a fire at this time of the year. In Australia, of course, the fires are much more likely to be huddled around us! Please make sure that your equipment is in full working order in case the emergency services need to call on us for assistance again (don't forget those spare batteries!) Talk to local WICEN members if you need a few ideas.

Finally, let's also remember that this is traditionally the season for good will (if only it lasted all year 'round)! Enjoy the holidays, stay safe, and let's make 1995 the year we get back to communicating!

### Thought for the Month

If you can lead a horse to water, and make it drink, then it's not a horse.

## VK6 Notes

Peter Parker VK6BWI

### Hamfest Hailed as Great Success

It was good to meet so many of you at November's NCRG Hamfest. Over 500 people attended and the 30 exhibitors present made it one of the biggest ever held. The choice of an air conditioned hall was a wise one as temperatures outside approached the old century.

The winners of the Homebrew contest were:

- First. VK6BHT for his 10 GHz SSB transceiver;  
Second. VK6UE for his HF linear amplifier; and  
Third. VK6KAR for an 80 m direct conversion receiver.

The door prize was won by Derrick Congdon, while the raffle winners were Brian VK6YBR, Gerald VK6KTN, Tim VK6ZW, Joe VK6BFI and Peter VK6JZA.

Thanks to all those who donated prizes. Highlights included the display of computer generated slow scan television, the car park market, the WIA Bookshop, antique radios, and numerous commercial vendors. Unusual homebrew equipment, such as a 160 m DSB hand held transceiver, a 40 m FM rig, a direct conversion single signal 80 m SSB receiver, a six metre transceiver based on a car radio, and a two metre FM receiver made from an unmodified AM car radio were all on show at the QRP Club's stall.

An innovation this year was the distribution of free "poster projects" containing all the information required to build a simple receiving package for either HF or two metres based on an AM car radio, presented on a single, easy to follow, A3 sheet. Such material proved popular with potential amateurs. If you want one, I still have a few left at the time of writing (mid-November).

### VHF Group to Hold Its First Meeting for 1995

If you have an interest in microwaves, satellites or VHF operating, you are urged to attend the meeting of the WA VHF Group on Monday, 23 January. The meeting commences at 7.30 pm and the venue is the Wireless Hill Meeting Room in Ardross. You will meet other experimenters who share your interests in the frequencies above 30 MHz.

Meetings, held on the fourth Monday of every month, sometimes include a guest speaker. A junk sale is held in the middle of the year. Members receive a bi-monthly newsletter produced by the group. If you live in the metropolitan area, annual subscriptions are \$1700, but country

amateurs need only pay \$1500. You may direct any enquiries to Terry Leitch VK6ZLT, or write to the group at PO Box 189, Applecross, WA 6153.

Tune to 144.460, 432.460 and 1296.460 MHz to hear the Group's beacons. In addition, a 10 GHz beacon is operational. The beacon on 50.066 is now operating after a break of several months off air. These beacons can be useful when working on equipment or experimenting with antennas.

### VK6s Urged to Support VHF/UHF Field Day

Portable and home stations are encouraged to participate in this year's VHF/UHF Field Day, to be held on 14 to 15 January. Last year, activity in Western Australia was comparatively high and this year promises to be even better. A VHF hand held or mobile transceiver, plus a small Yagi or vertical, will provide worthwhile results from your nearest hill and you need not operate over the entire contest period because a six hour period exists for busy amateurs. I would recommend you monitor the following frequencies: SSB — 50.150, 144.100 and 432 100 MHz; FM — 146.500 and 439.000 MHz. The rules were published in last month's *Amateur Radio* magazine.

### Help Yourself to a Better WIA

All those who desire to raise the status of amateur radio in Western Australia are urged to nominate for the WIA VK6 Council in time for the April Annual General Meeting. As a Councillor, you get a say in how this Division can best serve its members and advance our hobby. While 1994 was a year of steady progress for the Division, your involvement would make 1995 even better. Do yourself a favour and make 1995 the year you get elected to Council.

### "QRM" — News from the Tasmanian Division

Robin L. Harwood VK7RH

1995 is here and, coincidentally, the centenary of the first wireless message sent by Guglielmo Marconi. I'm sure that we will hear more about this event later on in the year.

On 19 November, Divisional Council met at the Domain Centre. In attendance were VK7GL, VK7EB, VK7PU, VK7WR, VK7JK, VK7FJ, VK7AX and VK7RH. There were two visitors, VK7PP and VK7RO.

What do we do with unclaimed QSL cards, particularly from non-members? What is the legal position regarding this as it is an offence to destroy mail? Council has referred this to the Hon Solicitor for his comments. In the meantime, it would help if you could contact VK7PP at the

QSL Bureau (GPO Box 371D) if you wish for your cards to be promptly forwarded or do not wish to receive any at all. This will assist his job substantially. Also a SASE would help.

VK7JK reported it is hoped that future Sunday morning VK7WI relays on 80 and 40 metres would rotate between the north and south to allow better coverage whilst the propagation is currently low. By placing the 80 metre relays in the north, it could make it easier for regions who are currently missing out due to propagation. Also we would like to hear feedback from those stations who are currently relaying VK7WI as to the numbers checking in on the callback.

Subscriptions will remain as they are now over the next 12 months but will again be reviewed later in the year.

The possibility of a State EMC coordinator was canvassed and will be referred to the next AGM which will be held on Saturday, 25 March at the Domain Activity Centre. Please note that all reports from the Branches should be in by 8 February and include the signature of the President, Secretary and Treasurer plus a signed Auditor's Statement.

Whilst in Hobart, I was quite amazed to see on a spectrum analyser, the devastation being wrought by the ever-increasing number of pagers operating so

## A. J & J COMAN ANTENNAS

|                                  |       |
|----------------------------------|-------|
| Dual band Collinear 2M&70cm      | \$ 95 |
| 2M collinear 2 5/8               | \$ 93 |
| 12 ele 2M                        | \$123 |
| 6 M J-pole                       | \$109 |
| 6 M collin 6 dbd rad 4 NEW       | \$150 |
| 6 ele 6 M                        | \$196 |
| Duo 10-15 M                      | \$265 |
| 3 ele 15 M                       | \$190 |
| 3 ele 20 M                       | \$298 |
| 20 m log-yag array 11 5 dbd      | \$685 |
| M B Vert NO TRAPS 10-80 M        | \$255 |
| Tri band beam HB 35 C 5 ele      | \$675 |
| 40 M near loaded 2 ele           | \$484 |
| 13-30 M logperiodic 12 ele       |       |
| all stainless/steel 14ings       | \$685 |
| 70 cm beam 12 ele half/Fed       | \$102 |
| 23 cm slot fed 36 ele brass cons |       |
| s/solder-assembled 18 dbd        | \$170 |
| 80 m top load/cap/vert           | \$260 |
| 3 ele 40m l/cap hats 60mm boom   | \$785 |
| 2 m 144 190 2 2 wave engh boom   | \$145 |

### PLUS FREIGHT

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PHONE 054 285 134**

close to our two metre allocation it is rapidly getting to the stage where operations within metropolitan areas are marginal. Repeater 7000 on Mt Wellington VK7RHT is difficult to access, even within Hobart at times. Why? Because many pager transmitters are co-sited on Mt Wellington. My spies also inform me that pager interference is much worse in the Melbourne CBD.

This month is rather quiet on the meeting front. However, there will be plenty of activity on the bands, so if you hear an interstate visitor or somebody from out of town calling on the repeater, give them a call and make them welcome to your area.

The weekly VK7WI broadcast will continue but the VK7NB weekly Wednesday broadcasts will take a break till the end of January.

### **VK7 Divisional 1994 Annual General Meeting**

Would all members please note that the Annual General Meeting of the Division will be held at the Southern Branch Activity Centre, Queen's Domain, Hobart on 25 March 1995, commencing at 1400 hours.

All notices of motion for the AGM must be received by the Secretary not less than 28 days prior to the meeting, and must be signed by at least three currently financial members. Nominations of candidates for election to the Divisional Council must be received by the Secretary, in writing, not less than 21 days before the AGM.

Not less than 10 days before the AGM, should an election be necessary, a ballot paper will be posted to each member of the Institute, which is to be returned to the Secretary, prior to the commencement of the AGM.

Proxies are to be deposited at the registered office of the Institute, Town Hall, Macquarie Street, Hobart 7000 at least 24 hours before the time appointed for the meeting. All of the above is in accordance with the Articles of Association.

### **Dates To Remember**

- |            |  |
|------------|--|
| 25 January | 11 am Domain Activity Centre — Divisional Council Meeting                                    |
| 1 February | 8 pm Southern Branch AGM — Domain Activity Centre  |
| 8 February | 7.30 pm Northern Branch AGM — Room 17 Block "C" Level 3 — Alarvale campus of Launceston TAFE |
| 25 March   | 2 pm Domain Activity Centre — Tasmanian Divisional AGM                                       |

Next month's column will be compiled by Ted VK7EB

## **FTAC Notes**

*John Martin VK3KWA, Chairman, Federal Technical Advisory Committee\**

### **New 10 GHz World Record — VK2ALU vs WA7CJO**

Lyle Patison VK2ALU has resumed EME experiments after an absence of some years. On 9 October 1994 he made a 10 GHz EME contact with Jim Vogler WA7CJO in Phoenix, Arizona.

Lyle's equipment included a G3WDG HEMT preamp, a WB5LUA preamp, and G3WDG/G4DDK modules. Power output was 16 watts from a Siemens travelling wave tube and the antenna was a 175 metre horn fed dish.

Jim's equipment was a homebrew transverter with a 300 watt TWT and a 4.8 metre dish, representing an ERP of about 30 megawatts (I wonder how much bird life there is in his area). This was the first known 10 GHz EME contact involving an Australian station, and also appears to be the first EME contact on any SHF band by a station in the southern hemisphere. The calculated terrestrial distance is 12601.3 km.

This contact is obviously an Australian record but it also appears to be a new world record as well. Not bad for a first attempt! Congratulations to all of those involved.

### **Packet Radio Band Plan Proposal**

The South Australian Technical Advisory Committee has proposed four extra two metre packet channels: 144.625, 144.650, 144.675 and 147.550 MHz. They have also proposed extra packet channels at 434 MHz and the allocation of three 70 cm repeater pairs for regenerative repeaters.

FTAC supports the 70 cm proposal but for two metres it is suggested that the space below 144.700 be kept clear for future use by linear translators and that the packet segment be expanded to 144.700-145.200 MHz instead.

Full details of these proposals have been circulated to all Divisions for distribution within each state, and copies can be obtained via the WIA Federal Office by asking for FTAC papers F94/1102 and F94/1103.

### **10 Metre Band Plan**

With the introduction of our new licence conditions in the near future, Intermediate (Combined) licensees will have use of the whole 10 metre band, and Limited licensees will have use of 29.0-29.7 MHz. The band plan needs to be reviewed to provide for the increased activity.

Two band segments are fixed already. The satellite band at 29.3-29.5 MHz is a "no transmit" zone. The other is the international FM segment at 29.5-29.7 MHz, including four repeater channels and a simplex calling frequency on 29.6 MHz. Local FM operation, as well as an SSB/CW segment, will have to fit below 29.3 MHz.

I would suggest that we use 29.0-29.2 MHz as our local FM segment. Following overseas practice, the FM channels would be at 20 kHz intervals from 29.02 to 29.18 MHz. The SSB/CW segment for use by Limited licensees could then be at 29.2-29.3 MHz, alongside the satellite band. A 6 metre liaison frequency of 29.285 MHz is also suggested.

Any comments on this proposal would be appreciated. Further details are in the paper F94/1113 which can be obtained from the WIA federal office.

### **Beacons**

Some changes and additions to the beacon list, which were not to hand when the new Call Book went to press:- The Townsville beacon VK4RTL is now on 50.087 MHz only. The Gunnedah 6 metre beacon VK2RGB is QRT. Proposed new 6 metre beacons are VK9RNI Norfolk Island on 50.005 and VK0IX on 50.199 MHz. The 1296 MHz beacon VK3RXX should be operational soon. There are plans to move the 432 MHz beacon VK3RAI to a new frequency and relocate it at Mt Hotham in northeast Victoria. New beacons on bands up to 1296 MHz have been proposed for Townsville and a site in eastern Victoria.

\*PO Box 2175, Caulfield Junction, VIC 3161

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**Help stamp out stolen equipment  
— always include the serial  
number of your equipment in  
your Hamad.**

## How's DX

Stephen Pall VK2PS\*

A survey is conducted each year by the "DX Magazine" among its subscribers about the most wanted DXCC country of the year. The 1994 survey indicated that the most wanted country was A5 Bhutan. Nearly two thirds of the 3000+ DXers who responded to the survey reported needing a contact with this mountainous country. Here is the list of the rest of the fifteen most wanted countries. Second is VU4 Andaman Island, then 5A Libya. VK0 Heard Island is fourth on the list, followed by 7Q Yemen, 3V Tunisia, FR/T Tromelin, XZ Myanmar and VU7 Laccadive Islands. VK0 Macquarie Island is number ten on the most wanted list. Number eleven is ZL8 Kermadec Island, then SV/A Mount Athos, FR/6 Glorioso Island, 3Y Bouvet, and the fifteenth most wanted country is E3 Eritrea.

What are the chances of some activity in 1995 from any of the above DXCC countries? The answer is, not very good. To be able to operate from Andaman Islands one has to have a special licence from the Indian PTT officials. This is inexplicably very difficult to obtain. Indian DXers have been working on this project for many years, so far without result. The Libyan political system is not helpful in supporting an amateur radio DX operation.

Heard Island is a protected wildlife territory, maximum transmitting power is restricted and the logistics of transport and money require a very big effort.

Yemen is accessible but present politics and the recent civil war make a future operation unlikely. Tunisia also has political problems and the military must approve any amateur activity. The recent Japanese operation with the callsign 3V8BB might alter the ranking of this DXCC country, at least among Japanese DXers.

Tromelin and Glorioso operations are sporadic, depending on the needs of the French Meteorological authorities on Reunion Island. Myanmar, formerly Burma, has just had a demonstration of amateur radio, with some helpful signs for the future. Macquarie Island, Kermadec Island and the Laccadives are wildlife refuges and scientific study stations; access for amateurs is not allowed or very much restricted.

Despite all this, one must not give up hope. Maybe, somewhere, somebody is already working in great secret on organising a DXpedition to one of the "top fifteen" countries?

May all your DX wishes be fulfilled in 1995. Happy New Year and good DXing to all of you.

### Bhutan A5

The expected activity by Jim VK9NS and Kan JA1BK from Bhutan in the early part of November 1994 resulted in 27 QSOs. Jim sent a long press release to the DX outlets in mid-November

explaining the present position of amateur radio in Bhutan. Here are a few details.

"A51MOC appeared briefly on 3 November on 14195 kHz SSB around 0400 UTC. This was a demonstration of amateur radio permitted by the Bhutan Ministry of Communications (MOC) on a short term basis only. We were given office space in the Ministry building and Kan and myself, with the assistance of several Bhutanese Ministry staff, had the station set up for the scheduled 10 am start with a few minutes to spare. The equipment was a Kenwood TS950 with external switched mode power supply, a Yaesu FL2100Z linear amplifier (donated to MOC in 1991) and many metres of coax to reach the Cushcraft R5 vertical. The antenna was assembled by Kan and we placed it well away from the building in what seemed to be quite a good position. Just when everything was finally together about ten minutes before the start time, we struck problems. High SWR on all bands. Phub (a Bhutanese technician) and myself went hunting with a meter and quickly found that one of the three sections of the coax was faulty with open circuit braid. Luckily we had a spare section and a few minutes later we were in business. The 27 contacts were made with JA stations. The Bhutanese operators were used to make several of the QSOs, guided by Kan and myself. It was wonderful to see and hear these QSOs and a good, but nervous time, was had by them both.

Has anything been achieved? This was never a DXpedition in the first place but it was an extension of the previous years of work. Looking at things in another way, this was A51MOC active from the Ministry of Communications building with dozens of Bhutanese looking on. We had our official visit from the Minister and a couple of questions addressed to me as Kan was operating. There were the usual photographs, and so on. We had no choice of the time to start operating and we all know that 10 am is not the best time to be on 20 metres."

Jim continues, "Let me now give you, the DXer, the negative side. There are now some 400 applications or letters on the MOC files, all with the same plea, 'please can I come to Bhutan to operate amateur radio?'"

Rather difficult to action, when we all know that Bhutan is not on the air. Foreigner before Bhutanese? I think not. There are at least four or five "major, well known DXers" involved in beating their own path to Bhutan."

Further on Jim says, "Most of these (letters) are sent with little or no interest in the broader picture (of establishing the amateur radio service in Bhutan). The Ministry of Communications is absolutely



Jim VK9NS with the Minister of Communications in Thimphu, Bhutan.

not interested that Bhutan is high on the DXers wanted list. I hope to travel to Bhutan again fairly soon, but HIXDA will make no previous announcements as to arrival time and so on."

Above is, in essence, what Jim said. The future of the amateur radio service in Bhutan is a very delicate issue. It is governed by the difficulties of a nation emerging from the "restricted" past, rich in culture, religion and national traditional systems, and the transition into a future of a totally open society with all the benefits of modern communications and ruling systems, but also with the negative side of the so called "modern culture" which the Bhutanese, understandably, do not desire to acquire.

## Amateur Radio in Taiwan and China

Fred K3ZO, on his recent visit to the Far East, attended the IARU Region 3 Conference in Singapore. His impressions about the status of amateur radio in Taiwan and China were published on Internet, and make interesting reading.

The delegates of CTARL, the Taiwan National Radio Society, handed out a sheet of calls indicating that as from 31 August 1994, there were 1534 licensed amateur stations in Taiwan. There is only one class of licence so all of these stations have permission to operate on all the HF bands. There is some talk of adopting a codeless VHF class of licence, if only to try to attract some of the 200,000 pirate VHF operators in Taiwan into amateur radio. The delegate from China's CRSA, BZ1HAM, told me that China had been reserving the BW prefix for foreign reciprocal operators but, if Taiwan manages to get all of these pirate operators into ham radio, Taiwan would run out of BV calls and might have to use BW as an overflow prefix. The Taiwanese delegates indicated that Taiwan has also begun to issue Club station licences. CTARL's club station is BV5Y, and regional branches of the club have station calls BV2YA, BV4YA, BV7YA and BV8YA so, evidently, the suffixes beginning with Y are reserved for club stations.

They also handed out a map indicating that BO is a prefix for some Taiwanese islands, and described the BOOK operation on Kinmen Island and the BOOM operation on Matsu Island. There are two permanent amateurs on Kinmen Island, BQ2AA and BQ2AB. Penhu Islands were recently changed from the BV7 area to the designator BV9A, and so the two permanent amateurs on these islands are now BV9AA and BV9AB.

BV9A is just off the south west coast of Taiwan. In addition to this, other islands indicated as having BV9 designators are:



Frank 5N0BHF in Nigeria.

BV9W Peng-Chia Yu, BV9M Mien Hua Yu, BV9H Hua-Ping Yu, BV9C Chi-Lung Yu, BV9K Kuei-Sha Dao, BV9G Lu Dao, BV9L Liu-Chiu Yu, BV9P Pratas, BV9S Spratty, and BV9U Chiu Dao. Of course the Taiwanese have asked that Pratas be designated as a new country and Spratty already counts as separate from Taiwan. The other islands are too close to Taiwan to qualify under anyone's definition as new countries, but will no doubt eventually get IOTA designators. BV9AA is ex-BV7ER and BV9AB is ex-BV7BQ.

This December, for the first time ever, the Taiwan authorities held the amateur radio examination away from Taipei in Kaoshiung, BV7-land.

The delegate of the Chinese Radio Sports Association, BZ1HAM, submitted a document which gives the prefix lineup in China as follows:

B VHF/UHF stations and contest stations on the mainland

BA Class 1 individual home stations,

BD Class 2 individual home stations,

BG Class 3 individual home stations

BG Jin Men (Quemoy) area of Taiwan BR Repeaters

BS0H Huang Yan Dao (Scarborough Reef)

BT Special events station

BV Taiwan

BV9P Dong Sha Dao (Pratas)

BY Club stations

BZ Personal calls of club station operators, to be used at club stations only.

There are now 33 old timers who have been issued permission to operate from their homes with the BA prefix.

On 17 July China conducted an examination in 28 cities for the class 3 individual home station licence. About

1400 people took the examination, about 1000 of whom are expected to pass. The main problem for most of these amateurs will be obtaining equipment. Imported ham gear is too expensive for most of their pocket books and ham gear is not yet made in China, though, if there is a big enough market in the future, that might happen.

As of June 1994 there were 99 Club stations (BY) in China. About 200 amateurs currently hold the BZ prefix call sign enabling them to use personal calls when operating from Club stations.

## Almost Lost at Sea — XF4M

"QRZ DX" quotes Frank AH0W/OH2LVG, who was one of the operators on Revilla Gagedos, telling the story of the return of the DXpedition to the mainland of Mexico.

"We were returning on Sunday night on this boat, Felipe Angeles, when the engine burned up. Listing and drifting, about 20 hours later, after the US Coastguard called Revilla's Commandancia, we were rescued by a small Mexican Marina patrol boat and returned to the island. It was a very terrifying situation to be on this very poorly equipped boat in the middle of the ocean surrounded by total darkness for hours on end and not having any control over the situation. After being returned to the island, hams in La Paz (Mexico) started contacting aircraft pilots all over Mexico in an attempt to get us off the island."

Finally the stranded amateurs were evacuated by Mexican military aircraft and were flown to La Paz on the Baja California Peninsula.

## Future DX Activity

- ZL1BAI Dave is on Great Barrier Island (36° 15' S and 175° 50' E) IOTA OC-201. QSL to Jim VK9NS, PO Box 90, Norfolk Island NSW 2899. Last month's issue incorrectly identified Dave as Jim — Jim is the QSL Manager. Apologies all around.
- A3SRK — Paul KK6H will be on the air until 7 February. Most of the activity will be on CW on 160 metres to 30 metres, from Tongatapu Island, IOTA OC-049
- VP8CNR Nigel is now active from Halley Base, Antarctica. QSL via Nigel, Halley Base, BAS, Port Stanley, Falkland Islands via UK.
- DU1KK is the new Philippine callsign of Dick Kwiatkowski WN7S. QSL to him C/o American Embassy, (IM), APO, AP 96440, USA
- Mike K3UOC is now active in Saudi Arabia with the callsign 7Z500 mainly on CW. QSL via W1AF
- Paul F6EXV will be active as 9Q5EXV until the end of January.
- HV3SJ — W9SI, one of the recent



**Elio FH5CB in his shack on Mayotte Island.**

operators of this station, said that the station had just been re-built and much more activity could be expected on all bands and modes from January.

- Ed TU5BA/XT will be operating for the next two years from Burkina Faso. QSL to Ed, American Embassy, Ouagadougou, Dept of State, Washington, DC 20521 — 2440 USA.
- D2XX is PA3CXC. QSL to home call.
- 5X4B is DL8AAI from Northern Uganda. He and his XYL (5X4A) intend to be in Uganda for one year. QSL to DL8AAM.
- G5RV will go to Uruguay and plans to operate as CX5RV between Dec 1994 and April 1995.
- XV7SW is Rolf SM5MX, who is operating from the Swedish Embassy in Hanoi. He has been allocated fixed CW frequencies of 28016, 28019, 21016, 21019, 14016, 14021, 7033 and 3505 kHz. QSL direct only (there is no QSL Bureau in Vietnam) to Rolf T Salme, Embassy of Sweden, Box 9, Hanoi, Vietnam.
- Jay W6GO and Jan K6HHD, producers of the QSL Managers List, announced that they have retired from producing the very informative list. The print subscription is now handled by the "DX Magazine", and the DXBBS and the Packet Cluster Sysop interface will be handled in the future by Paul and Nancy Smith, N4FFO and K4BARGW.
- The DXCC has approved recently 60 DX activity call signs. Most are from the

year 1994, but there were a few from 1993, one from 1992, two from 1991 and one from 1988 (A6/F2JD).

- You read it here, for the first time! The Hervey Bay Amateur Radio Club (PO Box 829, Hervey Bay, QLD 4655) will run a special event station, VISOPEACE from 1 August to 31 October 1995, remembering the 50th Anniversary of the cessation of hostilities in the Pacific Area, which terminated World War II.

### Interesting QSOs and QSL Information

(E = East Coast, W = West Coast, M = the rest of Australia)

- HS8AC — Cham — 14015 — CW — 0818 — Oct (E). QSL to Chumporn ARC 275-8, Poramintmonka Road, Amphur Muang, Chumporn 86000, Thailand.
- 3X0DEX — Didier — 7083 — SSB — 0806 — Oct (E). QSL to HH2HM/F Michel, via PO Box 104, F-22650 Ploubalay, France.
- 9K2HN — Hamad — 14195 — SSB — 1256 — Nov (E). QSL to HH2HM/F as above.
- OD5NH — Puzant — 14214 — SSB — 0550 — Oct (E). QSL to Puzant Azniran, PO Box 80903, Dora, Beirut, Lebanon
- VK0FPS — Phil — 14228 SSB 1301 — Oct (E). QSL to VK3MA, M A Withers, 10 Zenner St, Wodonga, VIC 3690.

- KC6SS — Jim — 3508 — CW — 1155 — Oct (E). QSL to WV5S, James M Hood, 11623 Smoking Oak Dr, Oklahoma City, OK 73150, USA
- 4S7DA — Denver — 14226 SSB — 1323 — Oct (E). QSL to W3HNK, Joe Arcure Jr, PO Box 73, Edgemont, PA 19028, USA
- A71CW — Chris — 14011 — CW — 0611 — Nov (E). QSL to Mr Chris, PO Box 22101 Doha, Qatar, Middle East or to SP5EXA via the Polish QSL Bureau.
- VP8CPC — Les — 14252 — SSB — 1001 — Nov (E). QSL to PO Box 260, MPA, Falkland Islands via UK
- 9N1WT — Willy — 14214 — SSB — 1237 — Nov (E). QSL to OE7KW7, Wilhelm Wallente, Perthalergr 17, A-6020, Innsbruck, Austria.
- L73AA — Dorys — 14204 — SSB — 0606 — Oct (E). QSL to LU4AA, Radio Club Argentino, Carlos Calvo 1424, 1102 Buenos Aires, CF, Argentina.
- 5R8ED — Helge — 14226 — SSB — 1403 — Oct (E). QSL to LA1SEA, Helge Siljberg, Box 117, N-2410, Hernes, Norway.

### From Here There and Everywhere

- Many more Thais have now received permission to set up their stations at home and you will begin to see more activity from these stations on HF. There are presently 480 citizens of Thailand who hold licences to operate on the HF bands. There are another 95,000 old licences for a "no code" VHF activity
- The Thais are now operating an SSB net at 1300 UTC on 7060 kHz. About 50 foreigners are also licensed in Thailand to operate on HF.
- The new QSL manager for Dave 5V7MD in Togo, and for Randy TJ1JR in Cameroon is Adam N7VEW. Both stations are missionaries and will be there for a few years.
- Fred K3ZO on his recent visit to Thailand observed the tremendous upsurge in the radio amateur population. More Club stations are being set up in the Bangkok area and many of the 55 Clubs in interior provinces of Thailand are obtaining HF permission. He renewed his HS0ZAR licence until September 1999. Incidentally, the new Thai QSL Bureau Manager is K3WUW/HS0ZBI with HS1ASN serving as his assistant. The address is RAST, GPO Box 2008, Bangkok 10501, Thailand. All QSL requests for HS0AC should go to Ray Gerrard, PO Box 1300, Bangkok, 10112, Thailand
- Unconfirmed reports indicate that

South Korea has run out of call signs in the HL series and will begin soon issuing calls in the DS series

- According to HB9CRV, one "greenstamp" (\$US1.00) is not sufficient to post a letter overseas. The cost of the postage is SF1.80 and a greenstamp is worth only SF1.28. In contrast, one IRC is worth SF1.80.
- 5H3JD has returned to Germany.
- Paul HBBJ, has advised that over 50,000 QSOs have now been made from Seboga. First stamps will be issued on 11 November. No documentation is yet available for DXCC status.
- If you worked ZA9A in the CQ WW SSB Contest, send your card to OKDXF, PO Box 73, 293-06, Bradlec, Czech Republic.
- A group of Japanese operators became active in Tunisia as 3V8BB on 19 November.
- QSLs to the Hungarian Contest Station, HG92HQ, HG93HQ, HG94HQ and HG95HQ, always active in the months of July during the IARU contest, should be sent to Gabi HASNK.

- I received an interesting QSL card and letter from Frank 5N0BHF. Frank hails originally from Austria, but has lived in Nigeria since 1980. He is employed with a German firm long established in Nigeria and involved in power generation. He is a resident of Abuja, the new capital of Nigeria. He uses a TS440S and a 4 element 6 band Fritzl beam antenna. He said he had very few QSOs with VK and ZL because, when the band is open, he is on duty at the workplace. According to Frank, Nigeria officially has 80 million inhabitants but, in reality, with transient immigrants, the population is probably around 120 million. Nigeria is a very rich country in mineral deposits. The big rush of the country population towards the towns started with the discovery of oil. This caused severe problems in their agricultural production from the land. "The youth does not really want to work, but the money does not lie on the streets", concludes Frank in his letter. His QSL manager is OE6LAG.

- Carol H44BC, the well known lady operator from Honiara, Solomon Islands has returned to the United States. Carol was a high school teacher of English in the Betikama High School in Honiara for the past 6 years. She holds a General call in the states, N8KIQ, which will be her new postal address. For the time being, QSLs sent to her Honiara address will be forwarded to her in due course.

- VISAAGP was a special event station celebrating the 10th Anniversary of the Adelaide, SA, Motor Grand Prix. QSLs to be sent to North East Radio Club, PO Box 36, Modbury North, SA 5092.
- There was an interesting visiting call sign on the air recently, VE7VDK/VK8 Atze, who originally held the call sign ZS5VDK. Last heard he was in the Northern Territory travelling and enjoying himself.
- A group of eight US amateurs were the first operators officially sanctioned by the Syrian Government to activate YK0A between 23 and 30 November. QSL to W6QAT.
- The latest unconfirmed report is that the DXAC recently received a petition for a separate country status for the Kingdom of Mustang. This is a small area bordered by Tibet and Nepal (coordinates 29° 10' N and 83° 55' E) which was once part of Tibet, but was ceded to Nepal from China. It retained its Tibetan culture and is off limits to foreigners.

- Did anyone work the special event station at the Asian Pacific Economic Conference in Indonesia? Apparently 8A1APEC was on the air from 14 to 15 November.

## QSLs Received

YS1DRF (3W W2PD), FH5CB (3M fm Op), VK2WAH (6W VK2KAA), VR6PAC (10W fm Op), UN7VV (2W VK4M2), ZAOK2PSZ (22W OK2PSZ), T11C (2W W3HNK), LX4B (5W LX1T1), BV4OQ (1W fm Op)

## Thank You

Many thanks to those who kept me informed, but especially to VK1FF, VK2DSL, VK2KCP, VK2KFU, VK4AAR, VK4BX, VK9NS and FH5CB. A special word of thanks also to the following publications, QZ DX, The DX Bulletin, DX News Sheet, The W6QO/K6HHD List Island News and Index.

73 and Good DX.

\*PO Box 93, Dural NSW 2159

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## An Old Timer Reflects....

Des Greenham VK3CO (SK) continues to look back over 50 years of amateur radio operation

Just after the war (WW2) it was very common to receive a barrage of short wave listener reports. This was brought about for two main reasons. We all operated on AM and everyone, without exception, had a "Dual Wave" radio set in their home. This meant it had shortwave facilities as well as receiving the normal broadcast band.

Many people listened into broadcasts from London, America, Moscow, etc. On the expansive illuminated dials of these receivers were also listed the amateur bands of 40 metres, 20 metres, etc. It was a very simple exercise to switch over and

listen to the Hams talking. Then the listening and reporting hobby started.

People would listen and record conversations heard on air and send a report by letter or specially printed QSL cards. Amateurs operating on the 20 and 40 metre bands were deluged with these reports. It was quite pleasing to receive an intelligent report from someone interstate or overseas but it was annoying when contacting a station in Greenland to receive a special report from a guy three doors down telling you that you were heard "loud and clear".

Then in the 50s came this new thing known as "Sideband". All the listeners could hear then was "Donald Duck" signals and the SWL reports virtually stopped. By this time the polished cab net radio receivers had been moved out into the shed and the portable transistor radio was the favourite. It no longer had the short wave bands. The number of listening enthusiasts dropped dramatically and those wishing to follow the hobby were forced to purchase special receivers with sideband capabilities.

Today, we receive SWL reports from remote places and these are of interest to the operator who will normally return a QSL card in appreciation

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## Over to You — Members' Opinions

All letters from members will be considered for publication, but should be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

### Foundation of WIA

I am researching the development of wireless/radio (especially amateur radio and amateur radio operators) in Western Australia.

I am writing this on the occasion of the 75th anniversary of the Wireless Institute of Australia WA Division which occurred on 3 November 1994.

The first radio club in WA (other than that at Perth Boys School, which had been in existence in May 1913) was the WA Radio Club, formed on Monday, 15 November 1913. (*Very progressive! Radio, not Wireless, in 1913! Ed*)

On 21 June the following year (1914) it was decided to extend the scope of the club, which in future was to be known as "The WA Institute of Radio and Scientific Experimenters".

Later that year, on-air activities of its members (and all experimenters at the time) were to be curtailed during the "great conflict". Meetings were to continue but, on 12 July 1916, it was announced that the President Mr R Thomson "was

going into camp". At the first recorded post-war meeting of the Club, it was he who proposed that the name be changed to "The Wireless Institute of Australia (WA Section)" in conformity with similar institutions in the Eastern States.

According to the WIA Book, Vol 1, two days later (5 November 1919) The Wireless Institute of New South Wales was renamed "Wireless Institute of Australia" (presumably NSW Division).

The Wireless Institute of New South Wales had been formed in May 1910. Like similar clubs in other states, they had existed independently of each other until after WW1. Indeed, it is doubtful if experimenters in "the West" had ever "connected with" their counterparts in the East.

While it would be correct to claim that the earliest organisation for wireless experimenters in Australia was the Wireless Institute of NSW, it would appear quite erroneous to claim that this was the beginning of the Wireless Institute, which

organisation should, this year, be celebrating its 75th anniversary, if we are to interpret history accurately.

Dave Hanscomb VK6ATE  
PO Box 39 Quinn's Rocks WA 6030

### Amateur Radio Magazine and Novices

In January 1992 I first "went on air" with a Novice licence, and very proud I was too. It was hard work making the grade. Apart from knowledge of the Morse code and a very basic grounding in things electrical, I was a true beginner, a novice by definition.

My tuition was provided by a very dedicated group of persons belonging to the ACT Division of the WIA. These people suggested, and indeed recommended, that I should become a member of the WIA. "We need your support, it produces a first class magazine", and so on. "Great", I thought, and so I became a member.

I have since parted with \$200 or more in membership fees and received monthly a magazine. I browsed through some of the magazines before recycling them and I was amazed how little information there was for a "novice". In fact, almost nothing. I have had more satisfaction from another magazine which I purchase now and

## WIA News

### Moves on the 80 m DX Window

The WIA is to approach the Spectrum Management Agency (SMA) with a proposal to extend the 3795-3800 kHz "DX Window" segment of the 80 metre band. A lengthy and very well-researched submission compiled by Peter Forbes VK3QI was put before the Federal Council at its October quarterly meeting. The submission recommended that the DX Window be extended, to cover from 3750 kHz to 3800 kHz on a "secondary usage basis outside of normal business hours (5 pm local time till 8 am local time)."

This adds 45 kHz to the Window, making it 50 kHz wide, while the operating period restriction permits amateur usage at times when most radio amateurs are able to pursue their interest.

The 80 metre DX Window gets its greatest usage during the troughs of the solar cycle. We are

currently in the declining phase of solar cycle 22, with the minimum forecast to occur between late-1995 to mid-1996, so 80 metre DX activity is increasing.

A 50 kHz-wide DX Window would bring Australia amateurs more into line with amateurs in other countries in the Asia-Pacific region (who have co-existed with commercial users for many years), and permit a lot more frequency agility to avoid the already high levels of international interference, according to the submission.

The recommendation to extend the Window by 45 kHz was based on extensive research, including monitoring the band between 3700 kHz and 3795 kHz, researching and interviewing commercial licensees of allocations in this segment, and monitoring amateur usage of 80 metres in this area of the band locally and internationally.

Commercial users of the 3750-3795 kHz segment have been declining for some years, and four reasons were identified: users moving to alternative HF allocations in the 4-6 MHz band which offers improved communications during daytime, increasing use of cellular mobile telephones, a change to satellite communications by some users, and moves to UHF CB with the spread of the UHF CB repeater network.

Monitoring between January and September 1994 has shown there to be no consistent or identifiable operations by commercial operators in Australia on 3750-3795 kHz. Below 3750 kHz, state emergency services make consistent use of the segment down to 3700 kHz.

The proposal is to be discussed with the SMA during the coming months.

then, containing a sequence of articles to upgrade one's licence. They were written in understandable language.

Please, Mr Editor, spare a thought for the Novice. Come down to earth now and again and let us have some "real" stuff for the beginner! In Victoria there are about 700 Novice licence holders. I wonder how many are not members because of this lack of Novice items?

Also, could I ask the WIA to consider lobbying for the Novice licence holder to have access to packet radio. Yes, I am writing this on a word processor. Indeed, the computer is almost standard household equipment these days and probably 100% of the Novices have one.

Also, could room be found for the Novice to have a small portion of the 14 MHz band?

**B Thirkell VK1PBT**  
49 Denny Street  
Latham ACT 2615

*(We can only publish the articles we receive from members. If no-one like yourself is impelled to fill in the gap, it will be filled by more advanced material from other authors. When the new regulations come into force they will refer to packet for Novices. 14 MHz for Novices is contrary to world-wide IARU (International Amateur Radio Union) policy. Access to that busy band is one of the incentives to upgrade. Life can't be too easy! Bill Rice VK3ABR, Editor)*

## Deceased Estates

This is a melancholy query but is there an established drill whereby a silent key's equipment can be appropriately disposed of to "good" homes or must it suffer the indignity of being bundled up and labelled "Deceased Estate — Offers"?

Hams, of course, are not alone in leaving behind treasured possessions. All hobbyists are affected but there is something especially poignant about a key going silent. It's not as though our signal gently fades away eventually to disappear in cosmic noise. No. One day we're there and the next we're up there.

The wise endeavour to give their things away to sensitive and appreciative souls thus sparing their immediate family the onerous task of wondering what to do with "All Dad's radio stuff". But this is not always possible and many a time we see in Hamads the heavy title "Deceased Estate".

Thus, is there an organisation that is prepared reverently to receive the clutter of a deserted shack? Would it, for instance, be worthwhile for *Amateur Radio* to operate such an Avalon for orphaned equipment? The basis could be that the equipment could be willed to *Amateur*

*Radio* who, in its turn, would dispose of it in whatever manner seems appropriate at the time. *Amateur Radio* would keep a proportion of the proceeds commensurate with their efforts and return the residue to the next of kin.

Doubtless some such idea has been mooted before and there are a number of obvious snags since some hams reign in great majesty over vast arrays of antennas and gear whilst others live in humble circumstances grateful to be one of the anonymous brotherhood of the air. Perhaps *Amateur Radio* would quail at the concept of avalanches of equipment being trucked to Victoria and would need to do some very careful sums before giving the idea a go.

On the other hand, many a ham, whose years before are greater than those in front, might rest in peace knowing that their gear would be going to an honourable place served by a priesthood of true believers. I hasten to add that I have no immediate plans to hand in my key and close my log book but it's as well to be prepared.

As we look around our shacks we see favourite screwdrivers, beloved meters and treasured components amidst our prime gear from which emits a soft

enchanting light that, through a length of wire spread aloft, invisibly hearkens to voices from out of the sky.

**Bob Hawksley VK2GRY**  
21 Wallumatta Road  
Newport NSW 2106

*(Beautifully put, Bob, but Amateur Radio is not really the organisation to do it. Each WIA Division already plays this part sometimes. Some may already have set up regular procedures or nominated appropriate officers. Amateur Radio can certainly publicise them. Ed)*

## Please Return

Some time ago, probably at least three years back, a visitor "borrowed" my copy of "A History of Radio in South Australia, 1897-1977", by Mr John Ross.

Unfortunately, that is the last I have seen of it.

Would readers please check their text books and see if it is still in their possession. These copies were \$10.00 each. Its return would be appreciated. Is it hoping too much that it just might be returned to me in due course?

The copy is autographed by Mr Ross.

**Tom Laidler VK5TL**  
18 Albion Avenue  
Glandore SA 5037

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## Pounding Brass

**Stephen P Smith VK2SPS\***

As we recover from Christmas and New Year festivities, a few kilos heavier I might add, it's time to put into practice those New Year resolutions.

Telegraphy, the premier mode of communications, is now 151 years old and still going strong. However, let's try and recruit new blood to the "code" and increase our ranks.

## IC Keyer Chips

Before I continue, I would like to mention that I have not included any circuits with the following information. These will appear in next month's issue as there is quite a bit of theory to cover.

The newer twin level or iambic paddle consists of two independent single-pole, single throw, switches. Each paddle is independent so that you may call for either dots or dashes by closing either, or you can get an iambic string by closing both paddles together, otherwise known as squeezing. It is impossible to close both paddles simultaneously. One lever always precedes the other to signal whether a dot or dash is to be generated first. Alternating short and long syllables is known as iambic, a term used in poetry.

Squeeze keying is fun and easy to learn

after you have acquired the correct technique of paddle manipulation. It minimises finger and wrist action, cutting down on fatigue which leads to glass arm effect, an effect for which the old hand key is notorious. If you squeeze the key paddles leading with the thumb (dot paddle) the Morse "period" is sent, all with two movements compared to seven on a hand key. By starting the squeeze with the index finger (dash paddle) we can produce such characters like C and K. By squeezing during a letter we can make other characters like Q and F. This type of keying is known as "type A iambic" (type B was mentioned last month).

About 90% of sales these days are type A. There seems to be no clear advantage for one or the other method except that, if learned on one or the other, you are likely to be unable and unwilling to change over.

It is so important to produce a dot or dash of the correct length, regardless of when the paddle is released. The space between elements must never be allowed to shorten by early key closure. Early closure is necessary to produce smooth keying because it allows the keyer circuitry to govern the exact length of the element spaces. Most keyers produced have some form of dot memory which is absolutely essential if the thing is going

to function correctly at high speeds. Dot memory allows the keyer to remember that you hit the dot paddle, even though you hit the paddle early and didn't wait for the commencement of the dot. Try sending "N" at over 20 wpm to test this feature. You cannot hit the dot and dash paddle fast enough to prevent both transmitting. If you do not have dot memory the dot will be lost in most cases.

A dash, as we know, is equal to three dots as opposed to a single dot. Therefore, we dwell on the dash paddle a fraction longer and thus a dash is seldom lost. Send the letter "A" as fast as you can and you will always get the dit followed by the dah. For reliable dot or dash insert on and true iambic keying, dot and dash memories are required. Another important factor is key debouncing. All mechanical switches will bounce slightly on both make and break. Unless the response of the keyer is conditioned to ignore this bouncing the circuit will think the operator is doing the switching and operate accordingly. The result of this bounce is the transmission of unwanted elements. Most of the time we blame ourselves for putting in that extra digit, not realising the keyer is at fault.

The chip I/Ps on pins 4, 5 and 6, 7 are circuits consisting of a 1 M $\Omega$  resistor and a 0.01  $\mu$ F capacitor. The bounce is around 5-10 mS. While this may seem short it begins to approach the length of a dot at high speed. Dot length at 50 wpm is only 24 mS.

The debouncing must not be so sluggish that it slows an operator trying to send at high speed. Weight control on

pin 20 allows the operator to vary the element weight from 1-1 dot-space and 3-1 dash-space ratio designed for efficiency and readability. Some amateurs feel that weight control has no place on a keyer because, if misused, it can degrade readability. On the other hand, modern rigs do not faithfully reproduce the keying input and therefore require adjustments of the keyer which quite a few amateurs are reluctant to tackle. At higher speeds of 25 wpm + most rigs lengthen the elements which, along with poor paddle manipulation, result in poor copy to the other operator. If weight control is desired, a capacitor of 0.22  $\mu$ F, a linear pot of about 500 k and a resistor of 5.6 k are used. The higher the value of each the more weight is added. How it functions is that the 0.22  $\mu$ F and the delay time provided by the pot and 5.6 k resistor stretches each dot and dash by a constant amount regardless of speed. In other words, the weight added is not a constant ratio of the dot or dash length.

Another interesting aspect of the ABM chip is the speedmeter pin 12. If you want to check your sending speed this circuit is for you. The circuit takes advantage of the averaging property of a moving coil meter. When you send a series of pulses through this type of meter at a frequency just a bit higher than its "flicker frequency" the meter pointer will remain stationary at some intermediate point on the scale.

For example, if you send a current of 100 mA, which is on 50% of the time and off 50% of the time, through a meter with 100 mA FSD, the meter will indicate 50

mA, the average value of the current. The value of the capacitor attached to C-Meter pin 11 in conjunction with internal resistance of the IC causes the speedmeter pin to go low for 1 to 1.5 mS each time the keyer clock changes state. As the keyer is adjusted to go faster, the rate of pulses increase accordingly causing the average current to increase.

I would advise using a separate power supply to the meter so that the indication is stable with varying power supply voltages. The speedmeter is connected to VDD on the one end and to the low pulsing pin on the other, an intermittent current flows, and the average of this circuit is indicated by adjusting R1, 100  $\Omega$ , and R2, 1 k pot.

The meter can be made to indicate the keyer speed directly in WPM.

A 50 mA meter is the best choice since it suits the ABM chip. Its scale is 0-50 and thus corresponds to 50 wpm. I have found that, in order to maintain accuracy and linearity, the value of the capacitor across the meter should not be increased beyond 0.22  $\mu$ F.

All of the 8044 series ICs are now priced at \$US19.95. Also, an 8044ABM-3 which includes an 8044ABM, a 20 pin socket, a PCB for a full featured keyer and a construction manual is available at \$US34.95. Further enquires can be made to (this is their new address) Curtis Electro Devices Inc, 4345 Pacific Street, Rocklyn CA, 95677, USA, or by phone at (916) 6320800.

Happy keying, see you next month with the circuits. -PO Box 361, Mona Vale NSW 2103

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# SOME THINGS HAVE NO COMPARISON

## amateur radio action

The magazine for the serious radio operator  
AT YOUR NEWSAGENT EVERY MONTH

# Repeater Link

Will McGhie VK8UU\*

## New Year

Will 1995 be the year that the changes to the amateur regulations come about, and, in part, repeater regulations? It continues to be an astoundingly long wait for the regulation changes. Why it has taken so long will never be known by most amateurs but the reason or reasons I'm sure would make a great story. From memory, 1995 takes us into the fourth year of waiting, let's hope it is the last and the regulation changes are what repeater managers and builders have waited so long for. Why the changes had to be a complete package, all or nothing, is also a mystery to me. Some of the repeater changes, from what little understanding I have of the situation, could have been implemented on their own.

## The Duplexer

For most amateurs aspiring to put a repeater on air, the duplexer is the most difficult part of the project. A simpler and sometimes better solution is separate antennas for receive and transmit. In an earlier article in *Repeater Link*, the pros and cons of separate antennas versus single antenna and duplexer were discussed. If the decision is to go with a duplexer design then all sorts of problems are perceived. Apart from construction the correct alignment is a big problem. All sorts of expensive test gear is thought to be required to set up a duplexer. It is true a spectrum analyser and frequency sweep generator is the way to go, but most of us do not have access to this type of equipment. There are, however, several other ways to line up a duplexer. I tried out a simple method using only a two metre transmitter, a length of coax, an SWR bridge and a 50 ohm dummy load. The result was a correctly aligned and working duplexer.

## The Name

Before I describe the alignment method, what is the correct name, duplexer or duplexor? These two words are used by amateurs to describe the same piece of equipment but do they mean the same thing? To my understanding, duplexor is correct. A duplexor is a device that connects two unlike objects, such as a transmitter and a receiver, to a common port such as an antenna. A duplexer connects two like objects such as two transmitters to a common port. That is my understanding. If I'm not correct please let me know.

## Duplexer Alignment

The accompanying diagram shows the setup. The two metre transmitter is connected via a 15 metre length of RG 58 coax to the cavity filter, and then through the SWR meter to a 50 ohm dummy load. Put simply, the transmitter is set to the frequency that the notch is to be set to on the cavity filter and then adjusted for a minimum reading on the SWR meter. Seems simple, but I'm sure you must have a few questions.

The most obvious question is how can a SWR bridge read such a low power output from the filter when the notch depth is around 35 dB? If 10 watts is going into the filter, 35 dB of attenuation would mean that about 3 mW comes out. My interest was, could you tune through the notch watching the SWR bridge go through zero power reading, and then climb again as you tune past the notch and judge the centre point of the notch? And tune back and forth through zero indication on the bridge and finally guess the 35 dB notch? To my surprise it was easy! I detuned a duplexer and went through all six cavities in quick succession. The result was a working duplexer that was as near to spot on as was required. The repeater worked into the duplexer with no desensing.

The SWR bridge is only used as a signal level indicator. Other types of detection equipment can be used but most amateurs have an SWR bridge. When looking for the notch turn the sensitivity of the SWR meter as high as it will go.

Due to the notch characteristics the SWR that the transmitter sees is very high. This is because the cavity filter is an open circuit with little of the transmitter power reaching the 50 ohm load. Almost all of the transmitted power is reflected back to the transmitter, hence the need for some isolation between the transmitter

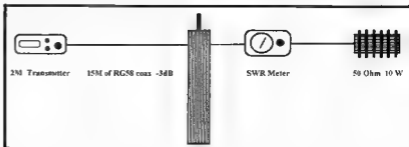
and the cavity filter. This is achieved by the 15 metres of RG 58 coax. At two metres this introduces a loss of three dB which equates to a total return loss of six dB. The reflected power back to the transmitter is reduced to one quarter of the transmitted power output. In SWR terms this is two to one and should not be a problem for the transmitter. The coax length can be increased if you want greater isolation between the transmitter and the cavity filter, but the sensitivity of the notch detection is reduced.

The cavity filter under adjustment is your standard two port band pass filter some 0.6 of a metre in length by 10 cm in diameter, that has either a capacitor or inductor added across the in and out ports to produce the notch. Placing a capacitor between the input and output produces a notch below the pass frequency, and an inductor produces a notch above the pass frequency. Only one of these components is added to a given cavity.

All these adjustments are done on one cavity at a time. For two metres you will require six cavity filters, three in the receive leg and three in the transmit leg. The complete alignment of the duplexer is done on each cavity filter on its own before all six are connected together. Even with the best test equipment, trying to align this type of duplexer with all the cavity filters connected together can be difficult and misleading.

Other methods I have used to set up a duplexer require considerable time and effort. There are three variables. The first is the frequency to which the filter is tuned. The second is the in and out coupling loop distance to the centre tuning element, and third is the value of the added capacitor or inductor. If you have done a few filters in the past then you have a feel for the rough setup of all these variables. If not, there is a degree of trial and error. What the test setup described here does is make the tuning up easier, not necessarily easy.

When tuning the filters with the added capacitor the final value will be around five pF. Start with the capacitor set on the



VHF Notch Cavity Filter alignment setup.

low side at about three to four pF. The filter with the added inductor is easier as the inductor is a fixed length of wire 2.5" (64 mm) in length soldered between the in and out ports and usually does not require adjustment.

If all that was required to tune a cavity notch duplexer was to set the frequency of the notch then it would be simple. However, what is required is minimum loss on the pass frequency and maximum attenuation on the rejection frequency. For alignment, all the variables must be correct. Using the method shown makes checking the pass and loss frequencies easier. Adjust the pass frequency first for maximum power to the SWR bridge. Change the frequency of the transmitter to the notch frequency and adjust the shunt C for best notch. Now go back to the pass frequency and see if there has been any change. Chances are there will be. Back and forth to achieve minimum loss on the pass frequency and maximum loss on the notch frequency. With a 20 watt source and three dB loss in the isolation coax, 10 watts is applied to the

cavity filter. When aligned correctly, half a dB is lost in the filter, resulting in about nine watts passing through to the SWR bridge and dummy load.

Of all the subjects to write about, tuning these types of cavity filters is the hardest. Trying to put onto paper all the hours of playing with these filters is difficult. If, during your tuning up procedure, you find that the pass to loss ratio is not heading in the right direction then one or more of the three variables is not set correctly. For example, when tuning the cavity with the variable capacitor a situation can occur where there is too much C. This is compensated for by tuning the main tuning element lower in frequency. The result is an improvement in either the pass or loss figure but not both. You can end up chasing your tail. If this happens, wind the capacitor out and start again.

This situation can also be due to the wrong degree of coupling between the coupling loops and the centre tuning element. Starting with the correct coupling is important. Almost all the cavity filters on two metres that I have tuned

have been built from the design that appeared in the *ARRL Handbook* many years ago, and is repeated from time to time in later years. From the outset I could never have achieved the results as published. After much playing around I found the coupling loops were too tightly coupled to the centre tuning element. Only by reducing the coupling of both loops could the correct results be obtained. I don't know why I could not achieve the results as published but I was pleased to find a way around the problem.

Quite a marathon on one method of tuning up a two metre cavity duplexer. I could write more, but where do you stop? One final point. If your duplexer introduces a poor SWR to your system then it is not tuned up correctly. Giving one of the cavities a last minute tweak to improve the situation is not a good idea. Tune each cavity in isolation on its own and then join them together. Hopefully the result is a correctly working duplexer.

\*21 Waterloo Cr Lesmurdie 6076 VK6UJ @ VK6BBS

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## WIA News

### Band Plans, Beacons and Bad Habits

Now that the summer VHF-UHF DX season is here, it's timely to remind operators of why there are band plans.

Basically, band plan arrangements help avoid mutual interference problems between otherwise incompatible modes and operations. The 1995 Call Book has full details for all the Australian bands, HF through SHF. On each VHF band, a segment is set aside for gentlemen's agreement for narrow band modes and weak signal operation. Other segments are set aside for FM and repeaters, packet radio, etc.

On the two metre band, the segment for narrow band modes is from 144.000 to 144.600 MHz. Within this 600 kHz segment, the first 100 kHz — from 144.000 to 144.100 MHz — is for CW only operation. The segment between 144.100 and 144.600 MHz, is for CW, SSB and other narrow band modes. Within this segment is a sub-segment exclusively for beacons, between 144.400 and 144.600 MHz. There is, in addition, a "national SSB calling frequency" of 144.100 MHz. All this is part of a long-standing gentlemen's agreement that is adhered to nationwide.

Unfortunately, a growing number of wideband FM signals is appearing

below 144.600 MHz, transgressing the band plan arrangement. FM stations have been heard using the national SSB calling frequency (144.100 MHz) and on other frequencies below 144.600 MHz.

Two metre operators who use the segment below 144.600 MHz, particularly those in pursuit of weak signal and long distance work, find FM stations who operate on top of 2 m beacon frequencies particularly annoying. Just because the VK5 2 m beacon cannot be heard by an FM station in Sydney is not a good reason for that station to operate in the beacon segment, using the VK5 beacon frequency or a frequency adjacent to it.

Beacons serve a number of purposes, among other things, to provide an effective indicator of propagation "openings", and to provide a constant reference signal for operators in the beacon's "local" area. At considerable distances, a beacon's weak "scatter" signal provides a means of checking or measuring station system performance.

It's just as important to have beacon frequencies free of interference when a band's NOT open as when it is open.

Many volunteers have spent a lot of time and money (often, WIA members' money) constructing, installing and maintaining the twenty four 2 m beacons currently operating in Australia.

FM stations operating in the beacon

segment completely negate the efforts of these people. In recent years, for example, there were occasions when FM operators in Sydney were actually having contacts on top of the Adelaide beacon frequency, when the beacon was clearly audible at the time! These stations declined to move, when asked.

There would be certain complaint if SSB or CW operators moved into the channelised FM/repeater segments and operated with impunity. Many such operators run considerable power to large antenna arrays and thus have high radiated power.

Courtesy and respect for the band plan, which preserves the rights of operators who pursue differing modes and operating practices, needs to be observed for the sake of peaceful coexistence.

The national 2 m band plan expressly reserves the region below 144.600 MHz for narrow band modes. The segment 144.600 to 145.700 is for general use, ALL modes.

Be a "good neighbour". FM is not compatible with narrow band modes and weak signal operation, even though DX may be worked (in the appropriate band segment) when conditions are really good.

Thanks to the NSW VHF-to-SHF DX Group for details.

# VHF/UHF — An Expanding World

Eric Jamieson VK5LP\*

All times are UTC

## STOP PRESS

Mike K6MYC is willing to run EME seds on 6 and 2 metres to late January from the US base at McMurdo Sound on the Ross Ice Shelf in Antarctica (grid square RN32hd).

Anyone wishing to QSO should contact Steve VK3OT at VK3RMV PBBS. Steve will forward the request to K6MYC.

## Six Metres

Ron VK4BRG advises that his beacon VK4BRG on 50.0775 (QG48) at Sarina is operational. He says that as far as he can discover the three beacons at Mackay under the callsign of VK4BRM are not operational.

Nev VK4CV writes to say that, following his expeditions to several South Pacific countries during 1985 and 1987, he would be prepared to lend substantial financial support to anyone contemplating operating from Pacific regions. If interested, you may contact Nev Cooper at 5 Cahill Street, Strathpine, Queensland, 4500. Nev says that, with the usual improvement to Es at the low part of the sunspot cycle, such countries as T33, T31, KH1, H44 and 3D2 Conway Reef could be within Es range, some of which have not been worked by many VK operators.

Nev also sent me a photocopy of a letter he received from the late Jean Duplat FK8AB on 18 March 1977. It is interesting in that he worked seven VKs between 22/1 and 25/1/87, they being VK2ZSG, VK2ZDN, VK2ZJG, VK4ZRG, VK2UQ, VK5ZMT and VK5ZLP. The contact with VK2ZSG is eleven years earlier than the contact VK3AMK had with FK8AX and which was listed as the first worked from VK. It is a pity such a letter did not surface prior to the publishing of my list last July but, it is as I said then, earlier dates for some contacts will become apparent with the passage of time.

## News from South Africa

David VK3ADW sent me a short letter he received from the South African Radio League, the one paragraph reading as follows:

*Re Multi-hop Sporadic-E propagation on 50 MHz:*

*Ever since the success of multi-hop Sporadic-E contacts on 50 MHz between the UK and USA in the Northern Hemisphere, we believed that the same could occur in the Southern Hemisphere*

*during our summer. We would like to arrange schedules with interested VHF amateurs in Australia to look for us on 50.110 MHz.*

73 Mike C Bosch, ZS2FM, VHF & Microwave Manager

The distance from the UK to the US is between 5000 and 6000 km depending on where each party lives. The distance from Durban in South Africa to Perth is around 7000 km or about the same distance as from Melbourne to Hawaii. We all know that unexpected contacts have been made with Hawaii although not necessarily via Es. Multi-hop Es requires reasonable power and antenna gain to achieve results but those requirements should not pose a problem to a well organised VK station.

It has always been of interest to me that South Africa has not been worked from Australia via Es and about the only reason I can offer is that simultaneously there have not been dedicated operators at each end. Also, during the F2 peak of Cycle 22, there were few contacts between Australia and Africa. The South Africans find it relatively easy to work Europe via TEP the same as we find it easy to work Japan by the same method, both being south-north paths.

I think the challenge could at last be taken by the VK6s, or anyone else for that matter, as no one knows just how far Es signals will travel. If anyone is interested the address is Cnr Duff Road and Louis Botha Avenue, Houghton, PO Box 807, Houghton, 2041, South Africa. Telephone (011) 484-2830. Fax (011) 484-2831. There is also a Telefax number which reads +27 11 484 2831. Please advise me if you will try.

## Papua New Guinea

A letter from Rick Warnett P29KFS, Vice-President of the PNGARS and Convenor of the Moresby Radio Group, has arrived on my desk via the office of Amateur Radio in Melbourne. It deals at length with the results of a duct between PNG and Queensland from 5/11/94 which provided enhanced signals on two metres for several days.

Rick said the opening is a regular event between the two areas during the "doldrum season" when the winds depart and the weather conditions allow a duct to be formed between PNG and much of the east coast of Queensland.

In past years such conditions have allowed 144 and 432 MHz contacts between Phil VK4FIL and Kyle P29KH at Madang on PNG's north coast. Phil also

managed to arouse Norm P29NB and rejuvenate his VHF interests. The intervening Owen Stanley Ranges were overcome by the excellent siting of the eastern highlands repeater P29RAE located on Mount Michael.

P29RPM on 147.000 is a voice repeater and P29TPY on 144.900 a digipeater and both are on Burns Peak in the Port Moresby area of PNG. In the Cairns area VK4RCA is a voice repeater and VK4RIK and VK4RCA digipeaters on 144.900. These have allowed stations of modest performance to make contact and exchange information. Direct contacts were made at good strength on packet and voice to stations in Townsville with both ends using high power and 2 x 16 element Yagis.

5/11: A good two metre opening saw several P29 and VK4 operators exchanging packet data, messages and voice during the morning and afternoon. Those involved included P29s KMT, PL, ZNQ, ZTC and KFS to VK4s FIL, KGV-1, KGV-15 and XUK. Several VK4s logged into P29BBS. Rick P29KFS was unable to raise any VK4 repeaters but could easily hear Phil VK4FIL reverse on 146.350 as he talked to Paul P29PL. It seemed there was a form of selective propagation favouring low altitude as Mount Bellenden Kerr at 1500 m was high enough to preclude it as a good receive site.

The best news was that the VK4s managed to work through the Goroka repeater giving operators in that area their first contacts to VK4. On 6/11 conditions were holding very well resulting in further contacts. So good were the conditions that Charlie P29NCS, listening from his Koki site on his AR3000 and discone, managed to monitor on 118 MHz Air Niugini flight NG098 all the way from Port Moresby to Cairns where it landed at 0830. While the plane was on the ground Charlie could hear the pilot in contact with the tower. 7/11: Conditions still good and much overnight activity with signals from VK4s AJL, ABW, XUK, KGV-1, TFT and ZZB as well as a host of P29s.

The conditions enjoyed by the above mentioned stations are similar to that experienced in the south when a large stationary duct encompasses the Great Australian Bight and provides contacts between Albany and Melbourne. In the latter case most of the activity is via SSB or CW.

## 10 GHz EME Record

Lyle Patison VK2ALU has sent me details of a recent 10 GHz contact he had with Jim Vogler WA7CJO. Lyle has applied for the Australian SHF record on 10 GHz in the EME category for what is believed to be the first Australian 10 GHz EME contact with any station, the first known

10 GHz EME contact involving a station in the Southern Hemisphere, and the first known EME contact on any SHF band which involved a station in the Southern Hemisphere. At 12601 km it may also be a 10 GHz EME world record but that has yet to be determined. The contact has been confirmed by the exchange of QSL cards.

Details are as follows. Date, 9 October 1994. Time 0215 UTC. Frequency: 10368.100 MHz. Mode: CW. Signal reports, "M" both ways. Lyle referred to both their stations as "backyard" stations, having been put together by themselves.

The equipment used at VK2ALU: Transmitter — Exciter/driver is of G3WDG/G4DDK design and uses a Yaesu FT290R 144 MHz transceiver to supply a tuneable IF input to the transmit mixer. The output from the transmit converter module is attenuated to approximately 1 mW which is the 10368.100 MHz drive to a Siemens travelling wave tube (TWT) with an output of 16 watts.

Receiver: Receive converter is of G3WDG/G4DDK design using a G3WDG004 HEMT pre-amp to a WB5LUA GasFet pre-amp to a G3WDG002 10 GHz receive converter incorporating a G4DDK004 oscillator chain and an Icom IC202 144 MHz tuneable IF unit, which was replaced by a G3WDG design wide-band 144 MHz noise amplifier and a detector/meter readout unit for detection of "moon noise" as necessary for antenna tracking purposes.

Antenna: 1.75 m diameter parabolic reflector antenna with prime focus feed using a pyramidal feed horn and horizontal polarisation. Dish f/d = 0.48. 3 dB beamwidth 1.1 degree.

Transmit frequency was monitored using an 18 GHz digital frequency counter with approximately 10<sup>6</sup> accuracy and the frequency of FT290R 144 MHz input was continuously adjusted to maintain a transmitter output frequency of 10368.100 MHz. The moon was visible at VK2ALU throughout the test period of 0100 to 0215. The antenna tracking of the moon was optimised manually by maximising the strength of WA7CJO's signal.

Equipment at WA7CJO: Transmitter — Homebrew transverter with Collins 32S-3 IF input. The transverter fed into a 300 watt output TWT.

Receiver: Homebrew receive converter with Collins 51S-1 IF output. A G3WDG HEMT pre-amp was used.

Antenna: 4.8 m diameter parabolic reflector using a SCR-584 positioner mount. 3 dB beamwidth approximately 0.7 degree.

In an earlier issue I reported on 10 GHz EME activity in the US and at that time

WA7CJO had worked 18 different stations in 10 countries in North America and Europe since 1988. The contact with Lyle was number 23 so his tally continues to increase.

During the test period covering the above contact the station operator Lyle VK2ALU was assisted by David Henderson VK2YKQ (antenna manual tracking), Robert Bonella VK2SRB (monitoring transmit frequency), John Simon VK2XGJ (receive/transmit time periods and antenna pointing co-ordinates), Les Holmes (part-time video camera operator) and their help was gratefully acknowledged.

## Microwave Workshop

For the past two years Lyle VK2ALU has run a "Microwave Workshop" at the Central Coast Amateur Radio Club Field Day held near the end of February at the Wyong Racecourse north of Gosford, NSW. Last year the workshop covered about 2½ hours, broken into half hour segments covering — Introduction to Microwaves; Simple WBFM 10 GHz equipment and test gear; Setting up and operating on microwave field tests; 10 GHz NB transceivers and their construction techniques; and Advanced propagation modes and their equipment requirements, which included non line-of-sight paths, ducting, rain scatter and aircraft reflection, troposcatter and 10 GHz EME.

In the likely event that he will be asked to hold a similar workshop next February, Lyle seeks information from interested people on the subjects they would like to see covered. He would like to set up equipment for contacts, etc, the presentation of short video tapes relating to 10 GHz field tests, backyard talks on microwaves, 10 GHz EME tests with WA7CJO, and so on, but this requires others to be involved for the other end of 10 GHz contacts, the setting-up of facilities for screening video tapes and generally assisting him to best present the workshop.

Last year Bill VK2ZAC gave support with his information on his microwave experiences; maybe he will assist again? Lyle is seeking help from several enthusiastic amateurs who can assist in the preparations for the workshop and is looking enviously at those who talk about their interests on the Sydney weekly two metre nets. Contact Lyle Patison VK2ALU, at 98 Heaslip Street, Wollongong, 2500 or phone 042 296 984 and indicate your preferences for discussion subjects and/or whether you can lend a hand to arrange the workshop.

## Two Mates

Ron VK3AFW phoned to say that on 30/10 at 1730 Des VK3CY worked K5GW

on 144 MHz EME with signals 529 both ways. Des runs about 200 watts to a single 13 element ATN Yagi while K5GW uses 48 x 10 element Yagis with a gain of 35 dBi and enough power from a single 8875 to produce more than one megawatt of ERP!

Also, 20/11 at 2146, Charlie VK3BRZ worked VK2TWR who lives on the other side of the ranges near Cooma, a very difficult 450 km path. Signals were 5 x 1 on 144 MHz. Roger VK3XRS has fairly regular contacts with VK2TWR on 144 200 but the contact with Charlie was the first time VK2TWR had worked into Melbourne.

## From the UK

Ted Collins G4UPS continues to near and work a variety of stations on 50 MHz: if the band is closed today it will probably be open tomorrow! His tally for October 1994 includes 4N1SIX/b, 9A3FT, 9A3HZ, 9H3TV, CT0WW/b, EH1DVY, ES0SIX/b, GB3BUX/b, GB3LER/b, GB3MGB/b, GB3NGQ/b, GB3RMK/b, I4CIL, I7WAN, IK1EGC, IK2QDX, IK3HHJ, IS0AGY, OE2UKL, OE5OLL, OE5XBL, OE6LOG, OZ2LD, OZ6VHF/b, OZ7ABV, OZ7DX, OZ7IGY/b, PA2VST, PA3FYM, S55ZRS/b, SM3EQV, SM7AED, SM7FJE, SP5CCC, SP6GZZ, SP6RLA, SP6VWM, SR6SIX/b, YU1IA, YU1SIX/b, YU7AS plus many UK stations. There are 13 beacons from 8 countries and 11 countries worked. In addition, Ted keeps his regular daily skeds with G3CCC and SM7AED.

The October 1994 issue of *Six News* from the UK Six Metre Group contains interesting snippets of information. Inside the front cover is a picture of Mike ER5OK who commenced operating on 1/6/94 with a CW transmitter running at less than 1 watt. After a couple of months or so he had worked 391 different stations in 31 DXCC countries and 127 grids! Shows what you can do if you live in Europe.

There is a full write-up on the 6 metre expedition to Jordan contained in 36 pages including photographs. It makes interesting reading, particularly one paragraph which reads: *Jordan is a marvellous country. The people are the friendliest we have ever seen in any country and they really welcome 'guests' with open arms. None of us have any reservation in recommending anyone to go there for a holiday.*

Geoff G4JCID from Jersey Island says he has just completed a beacon for Guyana which signs 8R1SMC on 50.013 and this will be forwarded in the New Year. Other beacons in the pipeline may include one for Svalbard (JW), Cape Verde (D44SIX), and a replacement for his own Jersey Island beacon! Having added D44 to his log, Geoff's country score now stands at 148 — still five to go. Geoff to catch JA4MBM at 153!

Just as an aside, Geoff wrote his letter to me on 17/11, posted it so that it was franked in Jersey on 18/11 and it arrived in Meningie today 21/11. Geoff had omitted to add Meningie, all the letter carried was my name, callsign, box number, the Meningie Post Code and South Australia. A bouquet to all postal offices en route and Australia Post. I would give Australia Post another bouquet if they could only do the same for me for letters between Meningie and Melbourne, which take longer!

Geoff said that early October commenced well with a good ridge of high pressure developing into an anti-cyclone over the central UK, which resulted in Frank G3FJJ in Essex working Jersey on 50, 144, 432 and 1296 MHz, and French stations from near the Spanish border were reported on 432 MHz.

On 9/10 GW3ZTH/p worked many French stations on 432 while HB9AMH/p worked UK stations on 10 GHz. On 12/10 the pressure read 1034 m/b which resulted in G8VR working GJ on 1296 with 1 watt. 13/10 provided beacons from everywhere into Jersey resulting in a string of DLs being worked on 70 and 23 cm. G3KEU reported a two-way contact on 10 GHz with an OZ. G3JMY and G3FYX near Bristol worked what is thought to be a UK record for 10 GHz narrow-band CW when both worked into Sweden for a distance of around 1300 km.

Due to the impressive conditions there were many countries available on 70 and 23 cm, but 10 GHz was given a good work-out and contacts were made two-way between the UK, SM, PA, DL, and HB9, etc. Geoff GJ4ICD had a ball on 70 and 23 cm; on the latter band he worked SK7CJ (1400+ km) plus four other Swedish stations at more than 1300 km. Stations located at levels just above the sea reported very poor propagation and said "everything is going over our heads!"

A few days later 50 MHz opened. On 21/10 PY5CC had an opening to the Caribbean. On 23/10 a good European opening, mentioned above in Ted Collins' report. Geoff took full advantage of this opening and worked the UK pile-up plus YU, OK and then 5B4CY at a distance of 3163 km. Another good opening on 29/10 with a large section of the UK able to work Yugoslavia at 59.

Emil Pocock W3EP in QST's *World Above 50 MHz* writes that June was the second best month for Es propagation during the last six years, according to Pay Dyer W4SIYX. Pat recorded 3495 minutes of E-skip on 88 MHz or higher on 25 different days in June, based on his continuous monitoring of the FM broadcast band from San Antonio. This corresponds well to conditions found on 50 and 144 MHz during the same period.

The cumulated total dropped to 1850 minutes in July and 255 minutes in August.

Those months correspond to our December, January and February. Traditionally, December has been our prime month for Es, especially during the latter half. Last summer we enjoyed a number of good two metre Es openings, always indicative of a good Es season. My February notes should outline how we fared by comparison with the US.

Although many amateurs have written off six metres with the disappearance of F2 propagation, it is interesting to note that on 25/6/94 at 1856 H88BE in Budapest (where they have no six metre allocation) heard KJ4E in Florida at 559. On the same day DL7QY heard N5JHV in New Mexico. Emil W3EP sums it up rather well when he says that, *Obviously there is still a lot more to be worked via*

*sporadic E especially as most European countries are now on the band. I believe he is correct. We may not be able to work Europe but our hope is that the operators in the Pacific island nations remember that they are within Es range of Australia — there will be much Es activity in VK to warn them and Channel 0 at Toowoomba is an early warning device!*

## Closure

Closing with two thoughts for the month

1. Put off until tomorrow only what you are willing to die having left undone, and
2. The ideal committee consists of two, four or six people who haven't time, and one person who likes to run things his own way.

*73 from The Voice by the Lake.*

\*PO Box 169, Meningie SA 5264

Fax: 085 751 043. Packet to VK5ZK for VK5LP

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## Silent Keys

*Due to space demands obituaries should be no longer than 200 words.*

The WIA regrets to announce the recent passing of:-

|              |          |        |
|--------------|----------|--------|
| A J (Jim)    | STEWART  | VK3AS  |
| P J (Percy)  | SEBIRE   | VK3MX  |
| L R (Les)    | MCINTYRE | VK3XF  |
| R F H (Ron)  | CANNON   | VK3BRC |
| G F (George) | PALMER   | VK4ZG  |
| B D          | ERSKINE  | VK6KBE |
| KE           | MILLIN   | VK7KA  |

### Arthur James (Jim) Stewart VK3AS

Jim Stewart died on 14 October, at Wodonga Hospital, following a stroke, aged 69 years.

Jim was born in Mildura and, after attending the local high school, was employed as a Junior Technician at 3MA. A year later he moved to Melbourne for a position in the PMG's Department with ABC Radio.

In 1956, with TV due to commence, he joined GTV9 as a Transmitter Technician and helped with the initial installation of a TV transmitter, antenna and associated equipment at Mt Dandenong. He continued in the position of Shift Supervising Technician until a stroke caused his early retirement in 1982.

On recuperation Jim and his wife, Les, moved from Mount Waverley to what had been their holiday home at Lake Tyers. He received a limited AOCP in 1959 with the call of VK3ZFS and later changed it to VK3AS after attaining the full AOCP.

Jim was well known in his position as Disposal Officer of the WIA. Many will remember his help with supply of components, kits and conversion of surplus mobile transceivers. In this

position he extended much time and effort for which he was honoured with a Life Membership of the WIA.

We offer our condolences to Les, their daughter, two sons and grandchildren. He will be remembered for his friendship and helpfulness to all. **Ray Miller VK3RF**

### Percy Sebire VK3MX

Percy Sebire VK3MX passed away at Kingston Rehabilitation Centre on Friday, 25 November after a short illness. His death was not expected although he had celebrated his 90th birthday in July. He is survived by his son Robert and daughter Elaine.

Percy was first licensed in 1930 and was always a dedicated "home brewer". His magnificent rack and panel transmitter covering 80 to 10 m on AM and CW is preserved in the Radio and Radar Museum at Essendon Airport whence it was moved after the closure of the Science Museum station VK3AOM. Everything was home made including the five power transformers.

Percy was a mechanic by profession and a perfectionist by nature. Even his antenna tower was home made and does not show a sign of weld splatter.

Percy was a member of the WIA, the Moorabbin and District Radio Club and the Radio Amateurs Old Timers Club. The Moorabbin and District Radio Club's annual home brew award fund was started a few years ago with a donation of \$200 from Percy.

Many old timers will regret his passing. Vale Percy Sebire VK3MX

**Allan Doble VK3AMD** ar

# HF PREDICTIONS

Evan Jarman VK3ANI

## The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for five of the bands between 7 and 28 MHz. The UTC hour is the first column; the second column lists the predicted MUF (maximum useable frequency), the third column the signal strength in dB relative to 1  $\mu$ V (dBu) at the MUF; the fourth column lists the "frequency of optimum travail" (FOT), or the optimum working frequency as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1  $\mu$ V in 50 Ohms at the receiver antenna input. The table below relates these figures to the amateur S-point "standard" where S9 is 50  $\mu$ V at the receiver's input and the S-meter scale is 6 dB per S-point

| V in 50 ohms | S-points | dB( $\mu$ V) |
|--------------|----------|--------------|
| 50.00        | S9       | 34           |
| 25.00        | S8       | 28           |
| 12.50        | S7       | 22           |
| 6.25         | S6       | 16           |
| 3.12         | S5       | 10           |
| 1.56         | S4       | 4            |

|      |    |     |
|------|----|-----|
| 0.78 | S3 | 2   |
| 0.39 | S2 | -6  |
| 0.20 | S1 | -14 |

The tables are generated by the GRAPH-DX program from FT Promotions, assuming 100 W transmitter power output, modest beam antennas (eg three element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

**VK EAST** The major part of NSW and Queensland.

**VK SOUTH** Southern-NSW, VK3, VK5 and VK7.

**VK WEST** The south-west of Western Australia.

Likewise, the overseas terminals cover substantial regions (eg "Europe" covers most of Western Europe and the UK).

The sunspot number used in these calculations is 22.2. The predicted value for February is 21.0.

## VK SOUTH — SOUTH PACIFIC

| UTC | MUF  | dBu | FOT  | 71 | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|----|------|------|------|------|
| 1   | 16.5 | 17  | 13.3 | 8  | 20   | 13   | 4    | 10   |
| 2   | 16.7 | 17  | 13.8 | 7  | 20   | 14   | 5    | -9   |
| 3   | 16.7 | 17  | 13.7 | -5 | 21   | 14   | 5    | 9    |
| 4   | 16.1 | 16  | 13.7 | 0  | 22   | 15   | 6    | 9    |
| 5   | 16.7 | 19  | 13.5 | 6  | 24   | 15   | 5    | -9   |
| 6   | 16.5 | 21  | 13.4 | 16 | 26   | 16   | 5    | 10   |
| 7   | 16.4 | 24  | 13.3 | 31 | 30   | 18   | 6    | 10   |
| 8   | 15.9 | 26  | 12.9 | 47 | 32   | 19   | 6    | 14   |
| 9   | 15.1 | 27  | 12.2 | 48 | 31   | 15   | 0    | 20   |
| 10  | 14.3 | 29  | 11.5 | 50 | 29   | 12   | -4   | -27  |
| 11  | 13.5 | 30  | 10.8 | 51 | 27   | 7    | -10  | -36  |
| 12  | 12.9 | 30  | 10.8 | 50 | 24   | 3    | -16  | -44  |
| 13  | 12.3 | 31  | 9.8  | 50 | 22   | 0    | -21  | -51  |
| 14  | 11.8 | 31  | 9.3  | 49 | 19   | 4    | -26  | -58  |
| 15  | 11.2 | 32  | 8.7  | 48 | 16   | 9    | -33  | -65  |
| 16  | 10.4 | 33  | 8.0  | 47 | 11   | 17   | -40  | -72  |
| 17  | 10.2 | 33  | 7.7  | 46 | 9    | -20  | -1   | -79  |
| 18  | 9.9  | 31  | 7.5  | 40 | 7    | -22  | -1   | -86  |
| 19  | 10.4 | 24  | 7.8  | 26 | 8    | -16  | 1    | -93  |
| 20  | 11.6 | 19  | 8.8  | 13 | 13   | 5    | 23   | -100 |
| 21  | 13.7 | 18  | 10.3 | 5  | 17   | 5    | 9    | -107 |
| 22  | 15.7 | 17  | 11.7 | 0  | 19   | 10   | 1    | -114 |
| 23  | 18.0 | 17  | 17.5 | -5 | 20   | 12   | -13  | -121 |
| 24  | 16.3 | 17  | 13.0 | 7  | 20   | 13   | 5    | -128 |

## VK WEST — SOUTH PACIFIC

| UTC | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 19.9 | 13  | 15.2 | 15  | 15   | 11   | 3    | 5    |
| 2   | 20.0 | 13  | 15.2 | 15  | 15   | 11   | 3    | 5    |
| 3   | 20.3 | 13  | 15.1 | 15  | 15   | 11   | 3    | 5    |
| 4   | 20.4 | 14  | 15.7 | 35  | 16   | 12   | 4    | 6    |
| 5   | 20.4 | 15  | 16.7 | 28  | 18   | 13   | 5    | 7    |
| 6   | 20.3 | 16  | 16.5 | 18  | 22   | 20   | 14   | 6    |
| 7   | 20.1 | 18  | 16.3 | 1   | 26   | 22   | 16   | 6    |
| 8   | 19.9 | 21  | 16.1 | 10  | 25   | 17   | 7    | 6    |
| 9   | 19.1 | 23  | 15.4 | 34  | 34   | 28   | 17   | 5    |
| 10  | 18.1 | 25  | 14.5 | 43  | 35   | 25   | 15   | 1    |
| 11  | 17.9 | 26  | 13.6 | 46  | 34   | 23   | 12   | 3    |
| 12  | 16.3 | 27  | 12.9 | 49  | 34   | 21   | 9    | 7    |
| 13  | 15.6 | 28  | 12.4 | 50  | 33   | 19   | 6    | 11   |
| 14  | 14.9 | 29  | 11.8 | 48  | 31   | 17   | 3    | 16   |
| 15  | 14.2 | 31  | 11.1 | 44  | 29   | 14   | 2    | 21   |
| 16  | 13.4 | 30  | 10.3 | 48  | 27   | 10   | -5   | -27  |
| 17  | 12.5 | 31  | 9.5  | 47  | 24   | 6    | -11  | -35  |
| 18  | 12.2 | 31  | 9.2  | 46  | 23   | 4    | -14  | -39  |
| 19  | 12.0 | 26  | 8.1  | 26  | 15   | 1    | -19  | -46  |
| 20  | 12.6 | 20  | 9.4  | 13  | 17   | 3    | -11  | -32  |
| 21  | 14.5 | 17  | 11.4 | 3   | 17   | 9    | -1   | -17  |
| 22  | 16.8 | 15  | 12.7 | -19 | 17   | 13   | 5    | -6   |
| 23  | 18.6 | 14  | 14.3 | 30  | 16   | 15   | 11   | 2    |
| 24  | 19.5 | 14  | 15.2 | -37 | 15   | 13   | 11   | 2    |

## VK EAST — AFRICA

| UTC | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 13.9 | 9   | 8.2  | -27 | 8    | 3    | -6   | -22  |
| 2   | 13.2 | 3   | 8.3  | -37 | 5    | 0    | -10  | -29  |
| 3   | 12.1 | -1  | 8.2  | -   | 2    | -1   | -9   | -24  |
| 4   | 14.3 | 1   | 10.7 | -   | 1    | 2    | -3   | -10  |
| 5   | 17.6 | 5   | 12.5 | 0   | 0    | 5    | 3    | -4   |
| 6   | 17.9 | 9   | 12.6 | 3   | 8    | 3    | 4    | 0    |
| 7   | 18.1 | 5   | 12.7 | 7   | 0    | 5    | 3    | -3   |
| 8   | 18.0 | 5   | 12.6 | 3   | 8    | 4    | 4    | -3   |
| 9   | 17.9 | 5   | 12.6 | 3   | 8    | 4    | 4    | -3   |
| 10  | 17.0 | 8   | 12.5 | 6   | 7    | 7    | 7    | 0    |
| 11  | 16.1 | 9   | 12.4 | 9   | 8    | 2    | -6   | -10  |
| 12  | 15.2 | 11  | 12.1 | -29 | 11   | 8    | 0    | 11   |
| 13  | 14.4 | -4  | 11.4 | -12 | 14   | 9    | -1   | -16  |
| 14  | 13.8 | -8  | 10.9 | 4   | 17   | 8    | -3   | -20  |
| 15  | 13.2 | 23  | 10.4 | 25  | 21   | 7    | -6   | -26  |
| 16  | 12.6 | 28  | 9.6  | 34  | 21   | 5    | -30  | -31  |
| 17  | 12.0 | 28  | 8.2  | 38  | 20   | 2    | -14  | -38  |
| 18  | 11.5 | 30  | 8.8  | 48  | 19   | 0    | -18  | -45  |
| 19  | 11.3 | 30  | 8.5  | 42  | 16   | -1   | -20  | -50  |
| 20  | 11.0 | 30  | 8.2  | 42  | 20   | 2    | -16  | -46  |
| 21  | 11.5 | 25  | 7.9  | 26  | 16   | -1   | -18  | -53  |
| 22  | 11.1 | 20  | 7.7  | 14  | 12   | -3   | -19  | -60  |
| 23  | 11.4 | 14  | 7.7  | 0   | 10   | -3   | -18  | -67  |
| 24  | 11.7 | 11  | 8.2  | -12 | 9    | -1   | -14  | -73  |

## VK SOUTH — AFRICA

| UTC | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 12.8 | 11  | 8.9  | -14 | 10   | 1    | -11  | -26  |
| 2   | 10.9 | 3   | 8.9  | -37 | 3    | -6   | -20  | -33  |
| 3   | 10.9 | -1  | 8.4  | -26 | 3    | -6   | -18  | -37  |
| 4   | 14.1 | 2   | 10.7 | -   | 2    | 1    | -5   | -17  |
| 5   | 17.7 | 5   | 12.5 | -   | 1    | 5    | 3    | -3   |
| 6   | 17.8 | 4   | 12.5 | -   | 1    | 4    | 3    | -3   |
| 7   | 17.7 | 4   | 12.4 | -   | -1   | 4    | 2    | -3   |
| 8   | 17.5 | 4   | 12.3 | -   | -1   | 4    | 2    | -3   |
| 9   | 17.8 | 5   | 12.3 | -   | 0    | 5    | 3    | -3   |
| 10  | 17.1 | 5   | 11.8 | 3   | 7    | 3    | 2    | -7   |
| 11  | 16.4 | 7   | 11.4 | 6   | 7    | 2    | -7   | -10  |
| 12  | 15.4 | 10  | 10.8 | -39 | 9    | 7    | 0    | -11  |
| 13  | 14.4 | 12  | 10.0 | -19 | 13   | 7    | 2    | -16  |
| 14  | 13.6 | 17  | 8.4  | 3   | 16   | 6    | -5   | -22  |
| 15  | 13.1 | 24  | 9.0  | 27  | 20   | 6    | -8   | -28  |
| 16  | 12.5 | 26  | 8.5  | 35  | 20   | 3    | -12  | -35  |
| 17  | 11.9 | 26  | 8.2  | 39  | 19   | 0    | -17  | -42  |
| 18  | 11.4 | 29  | 7.9  | 41  | 17   | -2   | -22  | -49  |
| 19  | 11.1 | 30  | 7.7  | 41  | 16   | -5   | -25  | -56  |
| 20  | 11.2 | 30  | 7.8  | 42  | 17   | -4   | -24  | -53  |
| 21  | 11.8 | 27  | 8.3  | 36  | 18   | 0    | -17  | -47  |
| 22  | 11.6 | 23  | 8.0  | 24  | 16   | 0    | -17  | -54  |
| 23  | 11.4 | 18  | 8.7  | 12  | 12   | -3   | -19  | -61  |
| 24  | 12.0 | 14  | 9.0  | -1  | 11   | -1   | -14  | -68  |

## VK WEST — AFRICA

| UTC | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 12.0 | 18  | 9.0  | 8   | 14   | 0    | -15  | -38  |
| 2   | 12.1 | 14  | 9.2  | -5  | 12   | 0    | -12  | -32  |
| 3   | 14.3 | 12  | 11.3 | -24 | 12   | 6    | -2   | -16  |
| 4   | 16.5 | 11  | 13.6 | -   | 11   | 1    | 1    | 5    |
| 5   | 18.9 | 10  | 14.0 | -   | 9    | 1    | 7    | 0    |
| 6   | 18.9 | 9   | 15.4 | -   | 7    | 10   | 8    | 0    |
| 7   | 18.0 | 9   | 15.5 | -   | 6    | 9    | 8    | 0    |
| 8   | 18.0 | 9   | 15.4 | -   | 6    | 9    | 8    | 0    |
| 9   | 18.7 | 9   | 15.2 | -   | 7    | 9    | 8    | -1   |
| 10  | 18.6 | 10  | 14.8 | -   | 8    | 10   | 6    | -2   |
| 11  | 18.0 | 11  | 14.1 | -   | 11   | 11   | 6    | -1   |
| 12  | 17.2 | 13  | 13.8 | 28  | 14   | 12   | 5    | 2    |
| 13  | 16.2 | 16  | 13.0 | -3  | 18   | 12   | 4    | 9    |
| 14  | 15.3 | 19  | 12.2 | 9   | 21   | 12   | 2    | -13  |
| 15  | 14.5 | 23  | 11.0 | 26  | 24   | 10   | -3   | -23  |
| 16  | 13.8 | 27  | 10.3 | 37  | 25   | 8    | -3   | -33  |
| 17  | 13.3 | 28  | 10.7 | 41  | 24   | 6    | -7   | -39  |
| 18  | 12.6 | 29  | 9.9  | 44  | 23   | 5    | -11  | -45  |
| 19  | 12.0 | 29  | 9.3  | 44  | 23   | 2    | -14  | -52  |
| 20  | 12.6 | 20  | 8.8  | 44  | 21   | 1    | -20  | -59  |
| 21  | 11.4 | 31  | 8.6  | 44  | 18   | -2   | -32  | -66  |
| 22  | 11.8 | 30  | 8.9  | 44  | 21   | 1    | -17  | -63  |
| 23  | 12.0 | 27  | 17.2 | -36 | 19   | 3    | -12  | -48  |
| 24  | 11.5 | 23  | 8.7  | 23  | 15   | -2   | -19  | -55  |

## VK EAST — ASIA

| UTC | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 22.6 | 14  | 17.9 | -39 | 18   | 19   | 15   | 9    |
| 2   | 23.3 | 12  | 17.5 | -   | 18   | 18   | 15   | 8    |
| 3   | 23.8 | 13  | 18.4 | -   | 18   | 18   | 15   | 8    |
| 4   | 24.3 | 13  | 18.5 | -   | 18   | 20   | 18   | 12   |
| 5   | 26.3 | 14  | 18.2 | -38 | 20   | 22   | 20   | 14   |
| 6   | 26.1 | 15  | 18.2 | -38 | 20   | 22   | 20   | 14   |
| 7   | 25.0 | 17  | 20.4 | -14 | 26   | 26   | 23   | 17   |
| 8   | 23.8 | 19  | 19.8 | 8   | 31   | 29   | 24   | 16   |
| 9   | 22.6 | 21  | 18.2 | 32  | 37   | 31   | 24   | 15   |
| 10  | 21.3 | 23  | 17.1 | -40 | 32   | 25   | 22   | 17   |
| 11  | 20.2 | 23  | 16.2 | 45  | 38   | 29   | 20   | 8    |
| 12  | 19.7 | 23  | 15.7 | 49  | 38   | 28   | 19   | 8    |
| 13  | 19.1 | 24  | 15.0 | 52  | 38   | 27   | 17   | 5    |
| 14  | 18.2 | 22  | 13.8 | 51  | 35   | 23   | 11   | 3    |
| 15  | 16.5 | 23  | 12.7 | 50  | 31   | 16   | 2    | -16  |
| 16  | 15.2 | 24  | 11.9 | 49  | 28   | 10   | 6    | -26  |
| 17  | 13.9 | 24  | 10.6 | 48  | 23   | 3    | -16  | -36  |
| 18  | 11.5 | 26  | 9.1  | 42  | 12   | 13   | -38  | -48  |
| 19  | 9.1  | 28  | 7.0  | 38  | -11  | 7    | -46  | -56  |
| 20  | 8.6  | 27  | 6.7  | 36  | -17  | 7    | -46  | -61  |
| 21  | 12.5 | 20  | 8.4  | 26  | 13   | 7    | -28  | -37  |
| 22  | 16.2 | 16  | 14.6 | 5   | 25   | 19   | 9    | -3   |
| 23  | 21.6 | 16  | 17.3 | 17  | 23   | 22   | 17   | 9    |
| 24  | 22.8 | 15  | 16.0 | -30 | 20   | 20   | 17   | 0    |

## VK SOUTH — ASIA

| UTC | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |
|-----|------|-----|------|-----|------|------|------|------|
| 1   | 18.0 | 12  | 14.4 | 12  | 12   | 7    | -2   | -2   |
| 2   | 18.4 | 11  | 14.8 | 12  | 12   | 7    | -2   | -2   |
| 3   | 18.9 | 12  | 15.6 | 11  | 12   | 8    |      |      |
| 4   | 19.1 | 12  | 15.7 | 12  | 13   | 9    |      |      |
| 5   | 19.1 | 13  | 15.7 | 13  | 13   | 9    |      |      |
| 6   | 19.0 | 13  | 15.5 | 38  | 15   | 9    | 1    | 1    |
| 7   | 18.7 | 15  | 15.3 | 27  | 16   | 10   | 1    | 1    |
| 8   | 18.7 | 15  | 15.3 | 27  | 16   | 10   | 1    | 1    |
| 9   | 17.8 | 22  | 14.4 | 28  | 30   | 21   | 12   | -1   |
| 10  | 16.9 | 24  | 13.7 | 39  | 32   | 20   | 9    | -4   |
| 11  | 16.9 | 25  | 12.9 | 43  | 31   | 17   | 5    | -12  |
| 12  | 15.2 | 26  | 12   | 48  | 29   | 14   | 0    | -26  |
| 13  | 14.4 | 26  | 11.4 | 48  | 26   | 11   | 0    | -32  |
| 14  | 13.9 | 26  | 11.0 | 47  | 25   | 7    | -9   | -32  |
| 15  | 13.3 | 27  | 10.5 | 47  | 23   | 3    | -15  | -32  |
| 16  | 12.6 | 26  | 8.9  | 45  | 18   | 3    | -25  | -32  |
| 17  | 12.0 | 25  | 8.3  | 44  | 12   | 1    | -37  | -32  |
| 18  | 10.4 | 24  | 8.0  | 40  | 0    | 33   |      |      |
| 20  | 7.7  | 26  | 5.0  | 30  | 37   |      |      |      |
| 21  | 11.1 | 18  | 8.4  | 25  | 3    | 23   | -1   | 1    |
| 22  | 15.2 | 17  | 11.1 | 19  | 12   | 10   | -1   | 1    |
| 23  | 17.0 | 14  | 13.6 | 19  | 17   | 12   | 5    | 7    |
| 24  | 17.7 | 13  | 13.9 | -34 | 14   | 12   | 5    | 7    |

| VK EAST — EUROPE |      |     |      |     |      |      |      |      |     | VK SOUTH — EUROPE |      |     |      |     |      |      |      |      |    | VK WEST — EUROPE |      |      |      |      |      |      |      |      |     |    |  |
|------------------|------|-----|------|-----|------|------|------|------|-----|-------------------|------|-----|------|-----|------|------|------|------|----|------------------|------|------|------|------|------|------|------|------|-----|----|--|
| UTC              | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |     | UTC               | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |    | UTC              | MUF  | dBu  | FOT  | 71   | 14.2 | 18.1 | 21.2 | 24.9 |     |    |  |
| 1                | 8.2  | -2  | 7.2  | -22 | 0    | -13  | -30  |      |     | 1                 | 8.9  | 3   | 7.7  | -27 | 0    | -11  | -27  |      |    | 1                | 10.4 | 13   | 8.0  | 3    | -1   | -14  | -33  |      |     |    |  |
| 2                | 8.4  | 10  | 6.6  | 25  | -1   | 15   | -32  |      |     | 2                 | 9.0  | 5   | 7.0  | -24 | 0    | -13  | -30  |      |    | 2                | 10.4 | 13   | 8.0  | 3    | -1   | -14  | -33  |      |     |    |  |
| 3                | 8.2  | 10  | 6.6  | 25  | -1   | 15   | -32  |      |     | 3                 | 8.7  | -11 | 6.9  | -32 | 0    | -12  | -27  |      |    | 3                | 9.1  | 4    | 7.2  | 22   | 2    | 17   | 35   |      |     |    |  |
| 4                | 8.4  | -11 | 7.2  | -38 | 0    | -9   | -22  |      |     | 4                 | 8.1  | -9  | 7.7  | -37 | 0    | -6   | -18  | -36  |    |                  | 4    | 10.6 | -2   | 8.0  | -35  | 0    | 0    | -22  |     |    |  |
| 5                | 12.0 | 3   | 9.6  |     | 1    | -2   | -11  | -25  |     | 5                 | 13.2 | 2   | 10.5 |     | -1   | 0    | -8   | -18  |    |                  | 5    | 13.4 | 2    | 10.5 |      | -1   | 0    | -8   | -18 |    |  |
| 6                | 15.2 | 2   | 12.2 |     | 1    | 3    | -2   | -11  |     | 6                 | 15.7 | 3   | 13.4 |     | -1   | 3    | 1    | -6   | 0  |                  |      | 6    | 17.9 | 5    | 14.4 |      | 1    | 6    | 2   | -5 |  |
| 7                | 17.8 | 6   | 14.3 |     | 2    | 6    | 3    | -3   |     | 7                 | 19.4 | 5   | 15.6 |     | -2   | 5    | 5    | 0    | 7  |                  |      | 7    | 20.7 | 6    | 16.7 |      | 0    | 7    | 6   | 1  |  |
| 8                | 19.9 | 6   | 15.9 |     | 4    | 8    | 4    | -12  |     | 8                 | 21.9 | 6   | 16.7 |     | -1   | 8    | 3    | 0    | 8  |                  |      | 8    | 22.8 | 7    | 18.3 |      | 0    | 8    | 8   | 5  |  |
| 9                | 21.1 | 12  | 17.1 |     | 11   | 14   | 12   | 6    |     | 9                 | 23.5 | 8   | 15.8 |     | 1    | 8    | 8    | 3    | 9  |                  |      | 9    | 24.9 | 10   | 19.1 |      | 1    | 10   | 10  | 7  |  |
| 10               | 20.9 | 17  | 16.8 |     | 18   | 21   | 21   | 17   |     | 10                | 18.9 | 11  | 15.3 |     | 6    | 11   | 9    | 3    | 10 |                  |      | 10   | 22.3 | 11   | 16.2 |      | 4    | 11   | 11  | 8  |  |
| 11               | 19.7 | 21  | 15.8 |     | 9    | 28   | 24   | 17   |     | 11                | 18.0 | 15  | 14.5 | -36 | 15   | 14   | 9    | 2    | 11 |                  |      | 11   | 21.4 | 12   | 17.8 |      | 10   | 14   | 12  | 7  |  |
| 12               | 18.7 | 23  | 14.9 |     | 27   | 32   | 26   | 17   |     | 12                | 14.0 | 20  | 13.7 | -2  | 2    | 12   | 0    | 0    | 12 |                  |      | 12   | 19.5 | 16   | 15.5 | -24  | 19   | 12   | 28  | 16 |  |
| 13               | 18.5 | 25  | 14.4 |     | 37   | 34   | 25   | 16   |     | 13                | 18.1 | 24  | 12.8 | 24  | 28   | 19   | 9    | -5   | 13 |                  |      | 13   | 18.3 | 23   | 14.6 | -32  | 32   | 13   | 28  | 16 |  |
| 14               | 17.5 | 24  | 13.6 |     | 42   | 33   | 22   | 11   |     | 14                | 15.3 | 26  | 12.2 | 25  | 29   | 17   | 6    | -9   | 14 |                  |      | 14   | 16.3 | 23   | 14.6 | -32  | 32   | 13   | 28  | 16 |  |
| 15               | 15.4 | 25  | 12.2 |     | 44   | 28   | 15   | 2    | -18 | 15                | 14.7 | 27  | 11.8 | 40  | 29   | 16   | 3    | -14  | 15 |                  |      | 15   | 17.5 | 22   | 13.8 | -38  | 31   | 20   | 8   | -5 |  |
| 16               | 13.1 | 27  | 10.6 |     | 43   | 22   | 4    | -12  | -36 | 16                | 14.0 | 26  | 11.1 | 43  | 25   | 9    | -27  | 17   | 13 |                  |      | 16   | 15.0 | 24   | 12.3 | -41  | 26   | 12   | -21 |    |  |
| 17               | 11.4 | 28  | 9.0  |     | 41   | 15   | -7   | -28  |     | 17                | 12.2 | 26  | 9.5  | 42  | 19   | 0    | -19  | 17   | 13 |                  |      | 17   | 16.0 | 24   | 12.3 | -41  | 26   | 12   | -21 |    |  |
| 18               | 10.0 | 29  | 7.9  |     | 39   | 7    | -19  |      |     | 18                | 10.8 | 28  | 8.4  | 40  | 12   | -11  | -34  | 18   | 13 |                  |      | 18   | 11.5 | 27   | 8.9  | -41  | 15   | 7    | -28 |    |  |
| 19               | 9.3  | 29  | 7.2  |     | 37   | 2    | -28  |      |     | 19                | 9.9  | 29  | 7.7  | 39  | 7    | -19  |      |      | 19 |                  |      | 19   | 10.8 | 28   | 8.2  | -39  | 10   | -15  | 39  |    |  |
| 20               | 8.9  | 29  | 6.9  |     | -1   | -35  |      |      |     | 20                | 9.5  | 29  | 7.3  | 38  | 4    | -34  |      |      | 20 |                  |      | 20   | 10.2 | 28   | 7.8  | -38  | 7    | -19  |     |    |  |
| 21               | 8.3  | 25  | 6.4  |     | 26   | -4   | -35  |      |     | 21                | 9.4  | 29  | 7.2  | 36  | 3    | -30  |      |      | 21 |                  |      | 21   | 9.9  | 28   | 7.5  | -38  | 5    | -22  |     |    |  |
| 22               | 7.8  | 16  | 5.1  |     | 14   | -7   | -35  |      |     | 22                | 8.0  | 19  | 6.2  | 19  | -9   |      |      | 22   |    |                  | 22   | 10.0 | 28   | 7.8  | -38  | 6    | -21  |      |     |    |  |
| 23               | 8.5  | 6   | 7.2  |     | 0    | 1    | -19  |      |     | 23                | 8.2  | 12  | 6.4  | 8   | -4   | -32  |      |      | 23 |                  |      | 23   | 8.1  | 25   | 7.0  | -30  | -1   | -31  |     |    |  |
| 24               | 9.6  | 6   | 7.4  |     | -12  | 1    | -14  | -32  |     | 24                | 10.2 | 10  | 7.8  | 6   | -4   | -11  | -29  |      |    | 24               |      |      | 24   | 8.7  | 17   | 6.7  | -18  | -4   | -32 |    |  |

| VK EAST — EUROPE (Long path) |      |     |      |     |      |      |      |      |  | VK SOUTH — EUROPE (Long path) |      |     |     |     |      |      |      |      |    | VK WEST — EUROPE (Long path) |      |      |     |     |      |      |      |      |  |  |
|------------------------------|------|-----|------|-----|------|------|------|------|--|-------------------------------|------|-----|-----|-----|------|------|------|------|----|------------------------------|------|------|-----|-----|------|------|------|------|--|--|
| UTC                          | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |  | UTC                           | MUF  | dBu | FOT | 71  | 14.2 | 18.1 | 21.2 | 24.9 |    | UTC                          | MUF  | dBu  | FOT | 71  | 14.2 | 18.1 | 21.2 | 24.9 |  |  |
| 1                            | 8.2  | -7  | 6.9  | -30 | 0    | -9   | -22  | -9   |  | 1                             | 8.7  | -10 | 6.6 | -28 | 0    | -12  | -26  |      |    | 1                            | 8.3  | 27   | 6.4 |     | 3    | -1   | -18  | -33  |  |  |
| 2                            | 8.0  | -2  | 7.3  | -24 | 2    | 9    | -22  | -9   |  | 2                             | 8.9  | -5  | 6.9 | -22 | 0    | -13  | -29  |      |    | 2                            | 8.8  | 16   | 6.6 | -35 | -3   | -1   | -18  | -33  |  |  |
| 3                            | 8.9  | 5   | 7.5  | -18 | 3    | 0    | -22  | -9   |  | 3                             | 9.1  | 0   | 7.0 | -15 | 0    | -14  | -31  |      |    | 3                            | 8.4  | 10   | 6.6 | -29 | -3   | -1   | -18  | -33  |  |  |
| 4                            | 8.5  | 7.5 | 14   | -10 | 5    | -8   | -27  | -9   |  | 4                             | 8.8  | 8   | 6.8 | -8  | 0    | -14  | -31  |      |    | 4                            | 12.3 | 11   | 6.8 | -35 | -3   | -1   | -18  | -33  |  |  |
| 5                            | 8.7  | 8   | 6.7  | 0   | 0    | -18  | -38  |      |  | 5                             | 8.0  | 6   | 6.2 | 1   | -5   | -27  |      |      | 5  | 7.8                          | -9   | 6.0  | -14 | -6  | -23  |      |      |      |  |  |
| 6                            | 8.4  | 14  | 5.8  | 11  | 0    | -23  |      |      |  | 6                             | 7.8  | 11  | 6.1 | 9   | -7   | -34  |      |      | 6  | 7.5                          | -5   | 5.9  | -7  | -28 |      |      |      |      |  |  |
| 7                            | 12.7 | 23  | 7    | 24  | 7    | 0    | -11  |      |  | 7                             | 11.8 | 22  | 7.0 | 23  | -1   | -28  |      |      | 7  | 8.4                          | 4    | 6.8  | -2  | -4  | -25  |      |      |      |  |  |
| 8                            | 12.4 | 25  | 9.3  | 19  | 2    | -13  | -35  |      |  | 8                             | 11.2 | 22  | 6.9 | 27  | 11   | -7   | -26  |      |    | 8                            | 10.5 | 12   | 8.3 | 3   | 4    | -12  | -29  |      |  |  |
| 9                            | 11.4 | 25  | 8.7  | 26  | 17   | -14  | -36  |      |  | 9                             | 10.7 | 24  | 8.1 | 30  | 15   | -3   | -20  |      |    | 9                            | 12.7 | 16   | 9.9 | 11  | 13   | 0    | 13   | 32   |  |  |
| 10                           | 11.4 | 15  | 8.8  | 0   | 12   | 0    | -12  | -31  |  | 10                            | 10.0 | 20  | 6.9 | 21  | 0    | -24  |      |      | 10 | 10.8                         | 20   | 8.4  | 24  | 9   | -9   | -27  |      |      |  |  |
| 11                           | 14.5 | 10  | 11.4 | 34  | 10   | 7    | 0    | -11  |  | 11                            | 6.5  | 11  | 6.5 | 6   | 1    | -24  |      |      | 11 | 11.8                         | 13   | 6.8  | 11  | -1  | -23  |      |      |      |  |  |
| 12                           | 14.8 | 4   | 11.5 | 4   | 4    | 0    | 9    |      |  | 12                            | 12.3 | 9   | 9.5 | -16 | 8    | 1    | -12  | -29  |    |                              | 12   | 12.9 | 9   | 6.9 | -4   | 1    | -18  | 37   |  |  |
| 13                           | 13.9 | -1  | 11.2 | 0   | 4    | 1    | -2   | -11  |  | 13                            | 13.1 | 9   | 9.3 | 8   | 2    | -4   | -16  |      |    | 13                           | 12.9 | 0    | 9.6 | -31 | 4    | 1    | -10  | -24  |  |  |
| 14                           | 13.2 | 6   | 10.3 | -3  | 0    | 4    | -12  |      |  | 14                            | 12.5 | -3  | 8.7 | 0   | 0    | -6   | -17  |      |    | 14                           | 13.6 | 0    | 9.2 | 0   | 0    | -5   | -15  |      |  |  |
| 15                           | 11.1 | 8   | 10.3 | 38  | 33   | 3    | -8   | -14  |  | 15                            | 11.9 | 9   | 8.8 | 0   | 1    | -6   | -17  |      |    | 15                           | 12.9 | 0    | 9.2 | 0   | 0    | -5   | -15  |      |  |  |
| 16                           | 10.2 | 10  | 9.1  | 5   | -2   | -5   | -13  |      |  | 16                            | 11.6 | -12 | 8.1 | 3   | -2   | -7   | -17  |      |    | 16                           | 11.8 | -15  | 8.0 | -6  | -4   | -8   | -18  |      |  |  |
| 17                           | 11.7 | 15  | 8.8  | -4  | 2    | 8    | -5   | -13  |  | 17                            | 11.6 | -13 | 8.2 | -4  | -2   | -6   | -16  |      |    | 17                           | 11.8 | -15  | 8.0 | -6  | -4   | -8   | -18  |      |  |  |
| 18                           | 12.3 | -12 | 9.1  | -5  | -1   | -5   | -13  |      |  | 18                            | 12.3 | 12  | 8.7 | -5  | -1   | -6   | -14  |      |    | 18                           | 11.4 | -17  | 7.8 | -10 | -6   | -4   | -8   | -18  |  |  |
| 19                           | 10.5 | -7  | 7    | -1  | 4    | -2   | -12  |      |  | 19                            | 10.5 | 10  | 8.5 | -2  | -2   | -3   | -21  |      |    | 19                           | 10.5 | -7   | 7   | -10 | -1   | -17  | -30  |      |  |  |
| 20                           | 11.7 | -12 | 9.1  | -3  | -2   | -7   | -18  |      |  | 20                            | 10.8 | 15  | 8.5 | -2  | -3   | -8   | -21  |      |    | 20                           | 10.8 | -12  | 8.1 | -10 | -1   | -17  | -30  |      |  |  |
| 21                           | 10.4 | -15 | 8.0  | -1  | -3   | -11  | -24  |      |  | 21                            | 9.5  | -29 | 7.4 | -9  | -12  |      |      |      | 21 | 9.5                          | -29  | 7.4  | -9  | -12 |      |      |      |      |  |  |
| 22                           | 9.8  | -14 | 7.3  | 0   | -5   | -14  | -30  |      |  | 22                            | 8.9  | -33 | 6.8 | -8  | -9   | -16  | -29  |      |    | 22                           | 8.1  | 27   | 6.3 | -21 | -19  | -22  | -32  |      |  |  |
| 23                           | 9.2  | 14  | 7.8  | 0   | 7    | -17  | -34  |      |  | 23                            | 8.5  | 26  | 6.8 | -6  | -5   | -14  | -27  |      |    | 23                           | 8.2  | 6.3  | -21 | -19 | -22  | -32  |      |      |  |  |
| 24                           | 9.1  | 11  | 6.9  | -36 | 0    | -8   | -20  | -39  |  | 24                            | 8.5  | -15 | 6.5 | -33 | 0    | -10  | -23  |      |    | 24                           | 8.1  | 6.3  | -21 | -19 | -22  | -32  |      |      |  |  |

| VK EAST — MEDITERRANEAN |      |     |      |     |      |      |      |      |  | VK SOUTH — MEDITERRANEAN |      |     |      |     |      |      |      |      |     | VK WEST — MEDITERRANEAN |     |        |     |      |      |      |      |      |   |
|-------------------------|------|-----|------|-----|------|------|------|------|--|--------------------------|------|-----|------|-----|------|------|------|------|-----|-------------------------|-----|--------|-----|------|------|------|------|------|---|
| UTC                     | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |  | UTC                      | MUF  | dBu | FOT  | 71  | 14.2 | 18.1 | 21.2 | 24.9 |     | UTC                     | MUF | dBu    | FOT | 71   | 14.2 | 18.1 | 21.2 | 24.9 |   |
| 1                       | 8.2  | -7  | 6.3  | -19 | 2    | -19  | -38  |      |  | 1                        | 8.0  | -4  | 8.1  | -3  | 5.8  |      |      | 1    | 7.1 | -7                      | 6.5 | -7     | -13 |      |      |      |      |      |   |
| 2                       | 7.8  | -18 | 5.0  | -26 | 0    | -3   | -18  | -36  |  | 2                        | 7.6  | -15 | 5.9  | -21 | 0    | -22  |      |      | 2   | 7.6                     | -15 | 5.9    | -21 | 0    | -22  |      |      |      |   |
| 3                       | 10.8 | 6   | 8.9  | 0   | 6    | -17  | -34  |      |  | 3                        | 10.8 | -4  | 8.9  | -9  | 0    | -6   | -18  | -36  |     |                         | 3   | 9.9    | -1  | 7.4  | 23   | -1   | -16  | -32  |   |
| 4                       | 10.8 | 6   | 8.9  | 0   | 6    | -17  | -34  |      |  | 4                        | 10.8 | -4  | 8.9  | -9  | 0    | -6   | -18  | -36  |     |                         | 4   | 9.6    | 6   | 11.9 | 5    | 3    | 7    | 0    |   |
| 5                       | 22.0 | 7   | 15.9 |     | -1   | 7    | 7    | 4    |  | 5                        | 20.5 | 8   | 16.8 |     | -1   | 7    | 7    | 4    |     |                         | 5   | 20.5   | 8   | 16.8 |      | -1   | 7    | 7    | 0 |
| 6                       | 23.6 | 8   | 17.9 |     | -2   | 7    | 8    | 4    |  | 6                        | 20.5 | 7   | 16.8 |     | -1   | 7    | 7    | 4    |     |                         | 6   | 20.5</ |     |      |      |      |      |      |   |

# HAMADS

## TRADE ADS

● **AMIDON FERROMAGNETIC CORES** For all RF applications. Send business size SASE for data/price to RJ & US Imports, PO Box 431, Kiama NSW 2533 (no enquiries at office please)

14 Boonyo Ave Kiama Agencies at: Geoff Wood Electron cs Sydney Webb Electronics, Albany Assoc TV Service, Hobart Truscotts Electronic Word, Melbourne and Mildura: Alpha Tango Products Perth

● **WEATHER FAX** programs for IBM XT/ATs \*\*\* "RADFAX2" \$35-00, is a high resolution shortwave weatherfax Morse and RTTY receiving program Suitable for CGA, EGA, VGA and Hercules cards (state which). Needs SSB HF radio and RADFAX decoder \*\*\*

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● **QTH FIVE** Hilltop acres excellent HF/VHF erect tower of your dreams amid tranquility characterful home 12 mins from main shops, 15 to superb beaches in go ahead Gosford \$365,000 Write Dave RMB 5443 The Ridgeway Holgate Gosford NSW 2250.

● **LOG** periodic, 8 element 13-30 MHz ATN type all hardware GC \$500. Phillip VK2QG (02) 675 3514

● **ICOM IC32AT** dual band 70 cm/2 m FM HH with BC38 desk top charger & cig lead \$500; **YAESU FT26** 2M FM HH as new \$325, **YAESU**

**FT757GX** HF mobile/base ng full WARC with FC757AT fully auto tuner & mobile bracket \$1300. Bob VK2AOE QTHR (02) 449 6364.

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## FOR SALE QLD

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## WANTED NSW

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## WANTED QLD

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## WANTED WA

● **KENWOOD TS940S** in immaculate condition. Would prefer one with optional CW filters. Steve VK6VZ (09) 298 9330

## MISCELLANEOUS

● **THE WIA QSL** Collection (now Federal) requires QSLs. All types welcome especially rare DX pictorial cards special issue. Please contact Hon Curator Ken Matchett VK3TL, 4 Sunrise Hill Road, Montrose Vic 3765. Tel (03) 728 5350. ar

## Spotlight on SWLing

Robin L. Harwood VK7RH\*

Well 1995 has arrived at last! Every year we hope that this year will be better than the last, yet it seems to degenerate in a dull sameness and the situation generally does not improve. What will 1995 bring? The proposed regionalisation of the BBC World Service is due to commence sometime early in the New Year, probably when the Northern Hemisphere commences Daylight Saving at the end of March. One query that I have, what are the co-operating rebroadcasting MW or FM outlets going to carry when they use the BBC WS as a midnight to dawn "filler" if the regional service to the Pacific is unavailable? I guess we will find out in due course.

The VOA site at Bethany Ohio ceased operating at 1800 UTC on 13 November 1994. I noted on the Internet that Shortwave echoes had a number of

messages of support to the 70 or so staff who were being laid off both at Bethany and at Greenville. This budgetary cutback pales by comparison to the 700 layoffs at Radio Free Europe/Liberty at Munich. You may have also heard that they are proposing to relocate the studios from Munich to Prague in the Czech Republic, yet I have heard whispers that the incoming Republican controlled US Congress may have other ideas.

Incidentally, Radio Moscow International is no more. It is now known as the World Service of the "Voice of Russia". This ties in with the title of Russian language service. Radio Tashkent in the Uzbek Republic has been noted in English at fairly good strength at 1200 on 13705 kHz.

Noted two new MW stations operating in Melbourne both carrying programming

for the ethnic community. One, "Radio Hellas", has resurrected an old callsign and frequency, 3XY on 1422 kHz. It has quite a strong daylight signal here in Launceston. 1593 kHz is carrying an Italian program but I have no additional information on it other than it is not associated with the other Italian outlet on 1116 kHz. All are commercial and "narrowcasting".

If you have access to a Phone BBS, there are several message areas devoted to shortwave radio available. The international echo "rec.radio.shortwave" is both on FIDONET and INTERNET, although there are minor differences. I find this echo is useful to receive advance information on schedules and special broadcasts but is dominated by North American related information which often isn't relevant to this region. Hence an Australian echo is active on FIDONET known simply as "OZ\_SW". Notice the underline between those two words — it is not a hyphen mark. Correct addressing is important in e-mail, otherwise your mail bounces back to you. Personally I find that the latter echo is more suited to my needs, although a fair amount of scanner and satellite information pops up. There are

specific message areas to cater for these groups and it is advisable that information should relate to the specific areas and not clutter up the echoes with useless or duplicative messages.

Dr Glenn Geers VK2EKL sent me a list of radio-related echoes currently available on INTERNET. Here is the current listing: alt.commercial-hit-radio.must.die: 0 alt.internet.talk-radio: 0 alt.internet.talk.radio: 0 alt.radio.shack.bill-bixby.dead.dead.dead: 0 alt.radio.digital: 0 alt.radio.internet: 0 alt.radio.networks.cbc: 0 alt.radio.networks.npr: 0 alt.radio.online-tonight: 0 alt.radio.scanner: 0 alt.radio.uk: 0 aus.radio.amsat: 1-316 aus.radio.packet: 0 aus.radio.wicen: 0 aus.radio: 1-1035 rec.antiques.radio+phono: 0 rec.radio.amateur.antenna: 0 rec.radio.amateur.digital.misc: 0 rec.radio.amateur.equipment: 0 rec.radio.amateur.homebrew: 0 rec.radio.amateur.misc: 0

rec.radio.amateur.packet: 0  
rec.radio.amateur.policy: 0  
rec.radio.amateur.space: 0  
rec.radio.broadcasting: 0  
rec.radio.cb: 0  
rec.radio.info: 0  
rec.radio.noncomm: 1-80  
rec.radio.scanner: 0  
rec.radio.shortwave: 1-1223  
rec.radio.swap: 0

As you can see, some of these are relevant to the States but there are quite a number that would be interesting to access. Check your local BBS SYSOP to see if these would be available. Some are also on FIDONET nodes. However, "OZ\_SW" and "OZ\_SCAN" are only on FIDONET and also are confined to Australia. There is also a satellite TV echo but I do not have exact details.

Do hope that you have plenty of fun over the summer holidays listening around. Take care and good monitoring!

\*54 Connaught Crescent, West Launceston TAS 7250  
VK7RAH@VK7BBS.LTN.TAS.AUS.OC  
Internet: robroy@clavis.apana.org.au  
Fidonet: Robin.Harwood.3.670301@fidonet.org

## Hamads

Please Note: If you are advertising items For Sale and Wanted please use a separate form for each. Include all details; eg Name, Address, Telephone Number (and STD code), on both forms. Please print copy for your Hamad as clearly as possible.

\*Eight lines per issue free to all WVA members, ninth line for name and address.

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\*Deceased Estates: The full Hamad will appear in AR, even if the ad is not fully radio equipment.

\*Copy typed or in block letters to PO Box 2175.

Caufield Junction, Vic 3161, by the deadline as indicated on page 1 of each issue.

\*QTH means address is correct as set out in the WVA current Call Book.

\*WVA policy recommends that Hamads include the serial number of all equipment offered for sale.

\*Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.

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Not for publication:

☐ Miscellaneous

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## CONTRIBUTIONS TO AMATEUR RADIO

Amateur Radio is a forum for WIA members' amateur radio technical experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for possible publication. Articles on computer disk are especially welcome. The WIA cannot assume responsibility for loss or damage to any material. "How to Write for Amateur Radio" was published in the August 1992 issue of AR. A photocopy is available on receipt of a stamped, self addressed envelope.

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## ADVERTISERS INDEX

|                          |            |
|--------------------------|------------|
| Amateur Radio Action     | 46         |
| Coman Antennas           | 38         |
| Daycom                   | 5          |
| Dick Smith Electronics   | 27, 28, 29 |
| Emtronics                | 33         |
| ICOM                     | OBC, 32    |
| Kenwood Electronics      | IFC        |
| Strictly Ham             | 9          |
| Terlin Aerials           | 13         |
| Tower Communications     | 19         |
| WIA Divisional Bookshops | IBC        |

## Trade Hamads

|                 |    |
|-----------------|----|
| M Delahunty     | 54 |
| RJ & US Imports | 54 |

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|   | Ref    | List Price |  | Ref    | List Price |
|---|--------|------------|--|--------|------------|
| <b>ANTENNAS</b>   |        |            |  |        |            |
| Ant. Compendium Vol 2 Software 5.25" IBM Disk           | BR293  | \$30.00    | Morse Code   | BR293  | \$16.50    |
| Antenna Compendium Vol 2 — APRIL                        | BR292  | \$32.00    | Morse Code — The Essential Language                      | BR331  | \$24.50    |
| Antenna Impedance Matching — APRIL                      | BR257  | \$52.00    | Morse Code Tapes Set 1: 5-10 WPM — APRIL                 | BR332  | \$24.00    |
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| Antenna Pattern Worksheets Pil of 10                    | BR902  | \$3.00     | Morse Code Tapes Set 3: 15-22 WPM — APRIL                | BR334  | \$24.00    |
| Easy Up Antennas  | MFJ28  | \$39.25    | Morse Tutor 3.3" IBM Disk                                | BR187A | \$20.00    |
| G-QRP Antenna Handbook — RSGB — 1992 1st Edition        | BR452  | \$22.50    | Morse Tutor 5.25" IBM Disk                               | BR187  | \$20.00    |
| HF Antennas Collection — RSGB                           | BR291  | \$44.00    | Morse Tutor Advanced 3.5" IBM Disk                       | BR329A | \$40.00    |
| HF Antennas for all Locations — Mason — 2nd Edition     | BR188  | \$45.00    | Morse Tutor Advanced 5.25" IBM Disk                      | BR329  | \$40.00    |
| Antenna Compendium Vol 1 — APRIL                        | BR183  | \$26.00    | <b>OPERATING</b>   |        |            |
| Novice Antenna Notebook — DeMaw W1FB — APRIL            | BR142  | \$20.00    | Amateur Radio Awards Book — RSGB                         | BR297  | \$25.00    |
| Physical Design of Yagi — 3.5" IBM Disk                 | BR388B | \$20.00    | Amateur Techniques — G3VIA — RSGB                        | BR393  | \$36.00    |
| Physical Design of Yagi — 3.5" Mac Disk Excel Format    | BR388C | \$20.00    | DXCC Companion — How to Work Your First 100              | BR345  | \$18.00    |
| Physical Design of Yagi 5.25" IBM Disk                  | BR388A | \$20.00    | DXCC Country Listing — APRIL                             | BR396  | \$5.00     |
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| Practical Wire Antennas — RSGB                          | BR296  | \$32.00    | Low Band Diving — John Devoldere — 2nd Edition 1994      | BR195  | \$45.00    |
| Reflections Transmission Lines and Antennas — 5.25" IBM | BR348A | \$20.00    | Operating Manual — APRIL — 4th Edition                   | BR192  | \$48.00    |
| Reflections Transmission Lines and Antennas — APRIL     | BR348  | \$52.00    | Operating Manual — RSGB                                  | BR339  | \$31.00    |
| The Antenna Handbook — APRIL 1994 edition with disk     | BR370A | \$65.00    | Passport to World Band Radio                             | BR346  | \$25.00    |
| Transmission Line Transformers — APRIL                  | BR329  | \$40.00    | Prefix Map of the World — RSGB (laminated)               | BR297  | \$25.00    |
| Yagi Antenna Design — APRIL                             | BR184  | \$40.00    | RTTY/AMTOR Companion APRIL 1st Ed 1993                   | BR45   | \$21.00    |
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| Electronics Data Book — APRIL                           | BR201  | \$32.00    | Transmitter Hiking                                       | BR222  | \$43.00    |
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